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Spawning Areas of British Columbia Herring: A Review, Geographical Analysis and Classification
Volume V: Strait of Georgia

D. E. Hay, P. B. McCarter, R. Kronlund and C. Roy

Department of Fisheries and Oceans
Biological Sciences Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

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SPAWNING AREAS OF BRITISH COLUMBIA HERRING

A review, geographical analysis and classification

Volume V

Strait of Georgia

by

D. E. Hay, P. B. McCarter, R. Kronlund and C. Roy

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RÉSUMÉ

Hay, D. E., P. B. McCarter, R. Kronlund and C. Roy. 1989. Spawning areas of British Columbia herring : a review, geographical analysis and classification. Volume V. Strait of Georgia. Can. MS Rep. Fish. Aquat. Sci. 2019: 268 p.

Pendant 50 ans, plus précisément de 1937 à 1986, on a étudié la répartition géographique du frai de hareng en Colombie-Britannique. L'analyse se fonde sur des données extraites d'environ 20 000 rapports annuels sur le frai produits par les agents des pecheries à l'égard dediverses régions côtières de la Colombie-Britannique. Pour chacune des quelque 90 subdivisions géographiques de la côte, on a dressé des tableaux qui montrent la fréquence annuelle de frai dans des segments d'un kilomètre. Des histogrammes montrent l'intensité du frai dans les secteurs particuliers. Des tableaux distincts donnent un résumé statistique des données de frai, y compris les dates moyennes de frai. Il y a également des tableaux illustrant la peche de rogue (1972-1986) à chaque endroit. Chaque secteur fait également l'objet d'un résumé descriptif donnant une classification de l'importance écologique du milieu de frai du hareng.

Mots clés: hareng, frai, Colombie-Britannique

ABSTRACT

Hay, D. E., P. B. McCarter, R. Kronlund and C. Roy. 1989. Spawning areas of British Columbia herring: a review, geographical analysis and classification. Volume V. Strait of Georgia. Can. MS Rep. Fish. Aquat. Sci. 2019: 268 p.

The geographical distribution of herring spawning in British Columbia, was analysed for 50 years, from 1937 to 1986. The analyses was based on approximately 20,000 records of spawning made annually for different regions of the British Columbia coast by Fishery Officers. For each of about 90 geographical subdivisions of the coast, tables are presented to show the annual frequency of spawns in one kilometer segments of the coast. The intensity of spawning in specific areas is shown by histograms. Separate tables present a statistical summary of spawn records, including mean spawning dates. Tables summarizing roe fishery activity (1972-86) are shown for each location. A descriptive summary including a classification of the ecological importance of herring spawning habitat, is presented for each area.

Key words: herring, spawning, British Columbia

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INTRODUCTION

In recent years there has been increased awareness and concern by industry, government and the public about the environmental protection of Pacific herring spawning grounds. A number of nearshore developments, such as oil exploratory activities and mariculture establishments could affect some inter- and subtidal spawning areas used by herring. Much of the British Columbia coast, perhaps 12% or more, has been used as a spawning site at least once during the last 50 years (Hay 1985). However, a much smaller proportion of the coast has been used for repetitive spawning over a number of years. The locations that support repetitive spawning deserve the most attention and consideration from possible environmental impacts. This report provides the basis for identifying significant herring spawning areas and locations which support major herring fisheries.

HERRING SPAWNING RECORDS

Detailed records of herring spawns in British Columbia are collected annually by Fishery Officers (Hay and Kronlund 1987). From 1928 to 1986 a total of nearly 20,000 records from over 1100 locations were recorded. The geographical size of a 'location' can vary from an island or cove measuring only 100 m in length or breadth, to bays or inlets more than 50 km in length. Also, geographical spawning locations frequently are 'clustered' so that sometimes many geographical names are used to describe the same general vicinity. Therefore, the continuity of spawnings cannot be examined by considering only single locations, rather, the adjacent locations should also be considered.

About 70% of all Fishery Officer spawn records have an accompanying map or chart showing the geographical position of each spawning. Records without charts consist of narratives or tables describing the position of each spawn relative to a fixed reference point, such as a Bay, Inlet, Island, etc. For spawn records with accompanying charts, we estimated the geographical positions of each spawn according to 0.1 km intervals along shorelines. This was done in all areas where herring were known to have spawned. Sub-divisions or 'sections' of the Statistical Areas (Hourston and Hamer 1979) were used as the smallest geographical unit. Most sections have a 'zero' position which increases, as high as necessary, to include all of the spawning locations. In several cases, spawning overlaps adjacent sections. In these instances, the spawn positions were made to be continuous between sections. Within most sections, herring spawning was not continuous along the shoreline throughout the whole section. Rather, spawning occurred in several different regions of the section, separated by distances without spawnings. This geographical discontinuity of spawning was reflected in the intervals. The 0.1 km intervals were not defined for the entire coastline but rather only for the general vicinity of herring spawnings. Therefore, there are geographical gaps in the position numbers. Positions of spawning were defined for each of the 110 sections on the coast that had a sufficient number of records for analysis.

Positions were estimated for records that did not have accompanying charts (about 30%). Using the 70% of the records which did have accompanying charts, an average spawn postion was calculated for each (approximately 1100) location. These 'estimated' spawning positions are distinguished from the measured positions in the analysis. A few locations had no charted spawn positions or an insufficient number to make a reasonable estimate. In these relatively few instances we assigned an 'estimated position' to some location names. This assigned position is distinguished from the measured and estimated positions in the analysis.

The accuracy of the estimated spawn positions varied with the quality of the record. Some positions were provided on fine-scaled, detailed maps, which allowed an estimated spawn position in our analysis to within 0.1 km or finer. Sometimes, however, only coarse-scaled charts were available so the estimated spawn position was accurate only to 1.0 km or more. In practice, the least precise estimated position involved records with very long spawns, longer than 5 km.

THE FORMAT OF THIS REPORT

This report is organized into about 106 sections corresponding approximately to sections of the major Statistical Areas defined by the Department of Fisheries and Oceans (Hourston and Hamer 1979). Since the work was completed, however, there have been some minor changes in the Statistical Area boundaries. Also, there have been minor changes in the boundaries and names used for sections (Haist and Rosenfeld 1988). These changes, however, do not interfere with the geographical analysis presented in this report but for some future analyses, these new geographical modifications will have to be made.

For each section, geographical location figures and as many as five tables are presented in the following order:

(1) The first figure shows an overview chart of the location of the section (highlighted) relative to the whole north, or south coast of British Columbia. (2) The second figure shows a more detailed chart (or charts) in 1-km sections. For most of the figures, only every second km is labelled. (3) Spawn positions, in km segments, by year are summarized in the first table. The symbols on the charts are explained below. (4) The second table shows a histogram of the cumulative frequency of spawning per km segment for spawning data pooled over all years from 1937 to 1986. The symbols are explained below. (5) The third table is a statistical summary of spawning, by year from 1937 to 1986. Details of each of the columns in the table are explained below. (6) The fourth table is a summary narrative which briefly

summarizes and comments on highlights of the preceding data. (7) The last table shows the history of roe fishery catches summarized by location, date, time and hailed roe fishery catch, by gillnet and seines, in each area.

DERIVATION OF SPAWN POSITIONS USED IN THE TABLES

Analysis of spawn position by year (first table in each section)

For any single position on the coast, there are three types of spawn records:

(i) Type 1: records with a geographical name (for example, Departure Bay near Nanaimo) and a documented geographical position, supported by Fishery Officer chart or map;

(ii) Type 2: records with no charted position but with a geographical name that was used to describe locations of spawns. From Type 1 records, an 'average' position, in terms of average km segment, of each geographical name was calculated. For each geographical name, the position of all Type 2 records is shown relative to the 'average' position of the Type 1 records. All spawn data taken prior to 1951 and subsequent to 1983 fall into this category because we have not had the resources to measure the spawn positions.

(iii) Type 3: records with no charted position and a geographical name that was not ever used with 'type 1' spawns. Therefore, the only spawn position that can be used must be roughly estimated by comparing the approximate geographical position relative to the kilometer intervals extended from adjacent spawn records.

The three types of spawn records are shown with different symbols on the tables 'spawn position by year'. In general, most spawn records have the geographic location indicated on charts. Such a spawn record, for a given year and a specific km interval, is indicated by a digit from 1 to 9, representing from one to nine spawn records within that km interval. The digit '1' is the most common record (i.e., a single record) and it could represent a spawn record that occupied (a) the full length interval (i.e., a full km of spawn, perhaps as part of a longer spawning that extended on both sides of the interval) or (b) only part of the interval. For instance, a spawn record of 100 m length would be represented as '1', a single spawning record within that length interval. A spawn record of 500 or 900 m length also would be indicated as '1', or a single record. However, two short adjacent spawn records, say of 100 m length each and occurring within the same km interval, would be indicated by a '2'. Two records occurring at exactly the same place but at different periods would be indicated by a '2'. Similarly, three or more adjacent records within the km interval, or three spawns occurring at different times within the same years but within the km interval would be indicated by the respective digit from '3' to '9'. There are some instances of numerous records of short spawn records, more than nine per km, and when this occurs the collective records are indicated by the asterisk symbol '*'.

For 'type 2' spawn records (where the geographical position of each record is estimated on the basis of the 'type 1' records with known positions) a single spawn record per km segment is indicated by the small case letter 'a'. Two records are indicated as 'b', three as 'c' and so on until a maximum of 26, shown as 'z'. Instances with more than 26 records per km are indicated with the symbol '#'. There are only a few instances of these symbols in the tables and when they occur, the represented positions are probably too tightly packed relative to the real positions of the spawns. For instance, sometimes when only a geographical name is used as the basis of the spawn position, then that name could apply either to a precise section of the coast (for example, Point Grey, which represents a relatively exact coastal position) or to a broad area (for example, Burrard Inlet which is many km in length). Therefore, type 2 records with geographical names that apply to broad areas will probably appear to be too condensed in the tables of spawn position by year.

Type 3 records are indicated by the hat symbol '^'. There is no attempt to indicated the number of such records per km interval. Therefore a single hat could indicate one or more type 3 spawn records per km segment.

Sometimes, there is more than one type of spawn record per single km interval. This sometimes happens in recent years when precise geographical names are used at one time as well as a new geographical name that has not been used before. Sometimes 'new' or additional names are used to describe some small, late spawns that occur 2-3 weeks after the main spawning activity.

The combination of different types of records, within a single km is as follows:

Record Combination	Symbol
type 1 records only.......	1 to 9, then '*' for 10 or more records
type 2 records only.......	a to z, then '#' for 27 or more records
type 3 records only....................	'^' for 1 or more records
type 1 plus type 2	'$' for 2 or more records
type 1 plus type 3	'∂' for 2 or more records
type 2 plus type 3	'ε' for 2 or more records
type 1 plus type 2 plus type 3	'%' for 3 or more records

Analysis of the cumulative spawn frequency by location (second table in each section)

The explanation of this table is similar to that of the first table. The total number of spawn records recorded for a single km interval is shown for each section. As discussed in the explanation for the first table, there are three types of records of spawn. In this histogram, the cumulative frequency of type 1, 2 and 3 records is indicated by the symbols '*', '0' and 'I' respectively and in the far right column, the total numbers of records per each km interval are indicated. For instance, a single record of a spawn with a known position, would appear as a '1' or '2' adjacent the '*' symbols. The number of intervals affected would depend on whether a single spawn overlapped the interval boundaries. Another example could be a 5 km spawn record, with a calculated spawn position (type 2) record, would be indicated by a '5' or '6' adjacent the '0' symbols.

Statistical summary of spawning by location (third table in each section)

This table contains a number of columns that provide a year-by-year quantitative history of spawning, summarized for each section. The explanation for each column is described below:

Column	Heading	Explanation
1	Year	The documented year, between 1937 and 1986.
2	Total records	The total number of spawn records (spawn occurrences) per year.
3	Spawn index	An estimate of the area of spawn (m^2) based on conversion factors that correct for the time trends in estimates of spawn intensity and spawn width (see Hay and Kronlund 1987).
4	Sum length	The total length of spawn in metres, for each year.
5	Av wid	The average width of spawn in metres, for each year.
6	Av int	The average intensity of spawn on a scale of 1 (very light) to 9 (very heavy) (For further explanation, see Hay and Kronlund 1987).
7	Av date	The average spawning date presented by the Day of the year (DOY) where Jan. 1 = DOY 1, Jan. 2 = DOY 2, Feb. 1 = 32 DOY, and so on.
8	SE date	The standard error of the mean weighted spawn date.

9	Wt date	The average weighted spawning date. The date (DOY) of each record is 'weighted' by the length of each record. In most instances, the weighted and unweighted are nearly identical.
10	Min day	The earliest spawn date recorded each year, by DOY
11	Max day	The latest spawn date recorded each year, by DOY
12	Ind day	The number of different days over which spawnings occurred. A single spawn record on a single day would be 1. One single record extending over 5 days would be 5, etc.
13	Ind loc	The number of different spawning locations used. For the total coast, there are a total of about '100 locations. If there were 10 separate small spawns within the same location, the number would be 1.

Herring spawn summary by location (fourth table in each section)

This table is a narrative based on the following criteria. The 'SPAWNING CONSISTENCY OVER TIME' is described as: (i) 'INFREQUENT' if the spawns were recorded in less than 50 percent of documented years, (ii) 'FREQUENT' if the spawns were recorded in 50 to 79 percent of documented years and (iii) 'CONSTANT' if the spawns were recorded in 80 to 100 percent of documented years. The 'MAGNITUDE OF SPAWNINGS' assessed from 1937 to 1986 for each section is described as: (i) 'VERY SMALL' if there was less than 50 hectares of cumulative spawn area, (ii) 'SMALL' if there was 50-200 hectares of cumulative spawn area, (iii) 'MEDIUM' if there was 201-500 hectares of cumulative spawn area, (iv) 'LARGE' if there was 501-1500 hectares of cumulative spawn area and (v) 'VERY LARGE' if there was greater than 1500 hectares of cumulative spawn area.

History of roe fishery catches by gear type and by location (fifth table in each section)

This table is based on the hailed catches, as reported in annual information bulletins or industry reports (Chalmers et al. 1981, 1982, 1985, 1986 and Humphreys et al. 1972, 1973 and Webb et al 1974, 1975, 1979 and 1980). Catches, in short tons, hailed on the grounds were cited here as they are the most accurate representation of the LOCATION of catches. They may differ from tables reported in the annual catch summaries or stock assessments and forecast reports (Haist et al. 1988) because these documents are usually based on sales slip records. These other reports should be consulted if more accurate total catch figures by major area are required. Furthermore, the first year of the roe fishery (1971) was not included in this compilation due to incomplete or inconsistent records. Also, it should be noted that hailed catches in parenthesis in table 5 indicates herring catch was from two or more sections.

LIMITATIONS AND APPLICATIONS OF THESE ANALYSES

The precise geographical limits of herring spawning probably are accurate to within a kilometer, more in some specific sites and less in others. The original Fishery Officer records were made with varying degrees of precision and the degree of precision often depends on the area of the spawning or survey; areas which have a lot of relatively fine-scale geographical detail, such as the Gulf Islands in southern Georgia Strait, probably are more accurate than areas with fewer geographical details, such as the relatively straight shoreline between Parksville and Deep Bay. In general however, the summaries presented here should be reasonable indicators of spawning activity to the nearest kilometer.

This geographical compilation and historical synopsis of herring spawns represents the culmination of several earlier but briefer versions. One of the earlier analyses, presented at the Annual Herring Stock Assessment Meetings as PSARC WORKING PAPER 86-5, had widespread distribution and was used for examination and evaluation of ecologically sensitive areas relative to potental impacts from oil exploration activities and mariculture developments.

During the several years of preparatory work that has gone into this project, we often have heard the criticism that the herring spawning data base has limited value because of alleged errors and omissions in the records. The most frequently cited error attributed to the records is that the data collected on the spawn dimensions were made in a sloppy way and "often by the cook on a patrol vessel"; alternately, we have heard that some Fishery Officers could not be bothered to go out and look for herring spawn rather, they simply noted the presence or absence of seabirds and assumed that herring spawn occurred wherever birds occurred. Undoubtably, some of these stories are correct, but probably for not more than a few of the nearly 20,000 records used in these analysis. Based on detailed examination of the original records, it is clear that the overwhelming majority of the Fishery Officers who report on herring spawns, do it in a dedicated, professional and competent manner, often with detailed comments and charts accompanying the records.

There are, nevertheless, two kinds of systematic error in these records which should be mentioned. The first appears to be a time-dependent trend for Fishery Officers to underestimate spawn width. This occurred mainly in the earlier years, when it was generally believed that most of the spawn was confined to the inter-tidal zone. It has not been until relatively recent times that the significance of the subtidal fraction has been appreciated (Haegele et al. 1983). Also, there has been systematic changes in the spawn intensity measurements, in part reflecting changes in the measurement or rating criteria used over the years (see Hay and Kronlund 1987 for more detail). However, neither of these systematic errors have any effect on the analysis in the present study, which does not involve any presentation of the 'spawn index' which is fully described in Hay and Kronlund (1988). The only other kind of error in the records which can severely affect conclusions presented in these analyses, is that of incompleteness. It is clear that for some locations, records were not collected systematically each year. As much as possible we have attempted to comment on this in the narrative summary tables.

others, with no history of herring spawns, are shown to be not important. There are many locations or km segments, however, which are in between. They have a record of spawning which varies in time. These 'intermediate' spawning locations are the most difficult to evaluate in terms of their importance in maintaining the well being of the herring resource.

In general, we suggest that it is essential to conserve the spawning areas that have a history of repetitve spawning over time. Also, areas immediately adjacent to spawning areas must be protected. Ultimately however, each instance of a nearshore development that might impact herring spawning areas must be decided on its own merits and it should be kept in mind that we still do not understand why some areas are used as spawning areas and others are not. Some locations which are not known as spawning areas appear to have the appropriate vegetative substrate and local oceanographic regimes that are found in documented spawning areas (Hay et al. 1984). Further, herring 'enhancement' does not appear to be possible at the present time (Hay and Marliave 1988). Therefore, if herring spawning habitat is lost, we cannot necessarily expect the impacted stocks to spawn in other locations nor can we realistically expect that new spawning habitat can be created. Finally, throughout this report we have commonly used the word "stock" or "resident stock" that refer to herring that inhabit an area. This usage is for convenience only, and cannot be used as an indicator of any particular uniqueness (genetic or otherwise) of herring from one place to the other.

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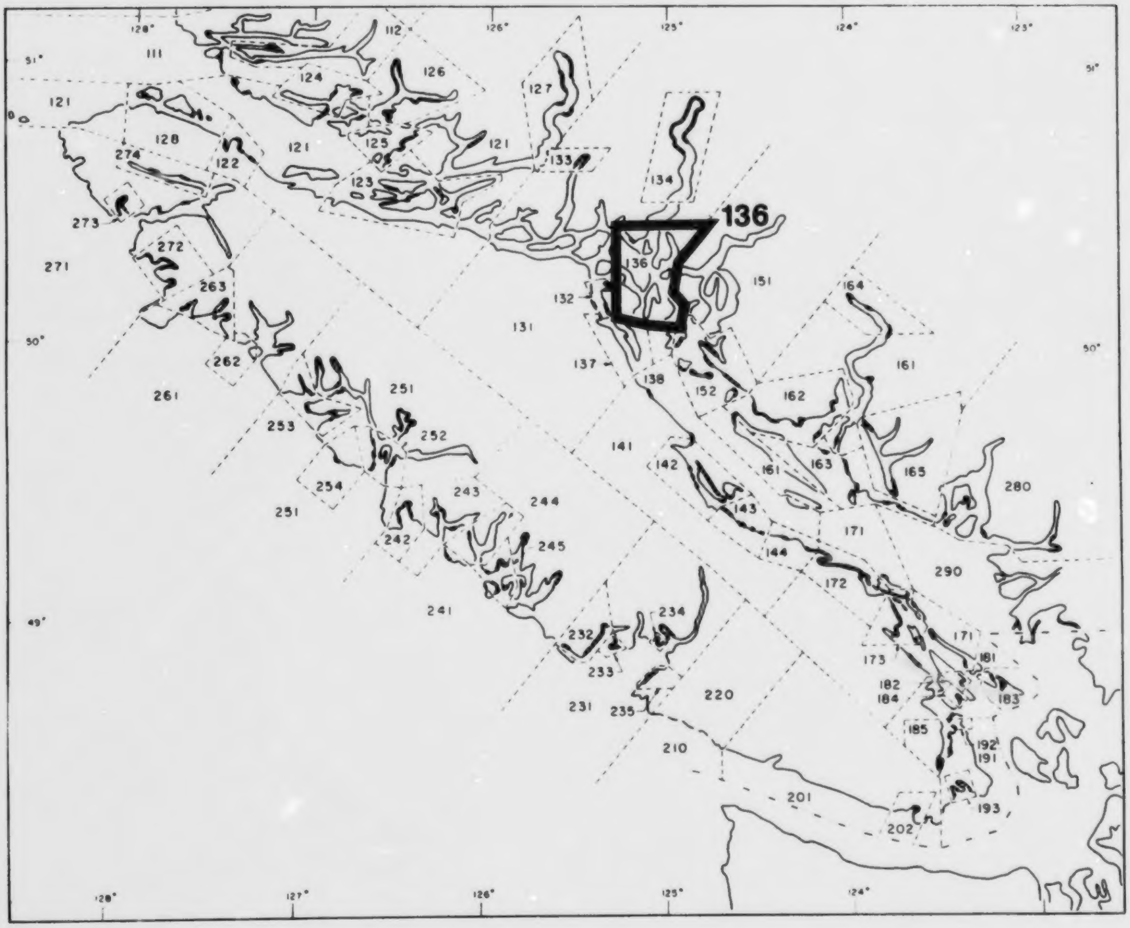

Fig. 136-1. Overview map showing location of section 136, Other Area 13 Gulf.

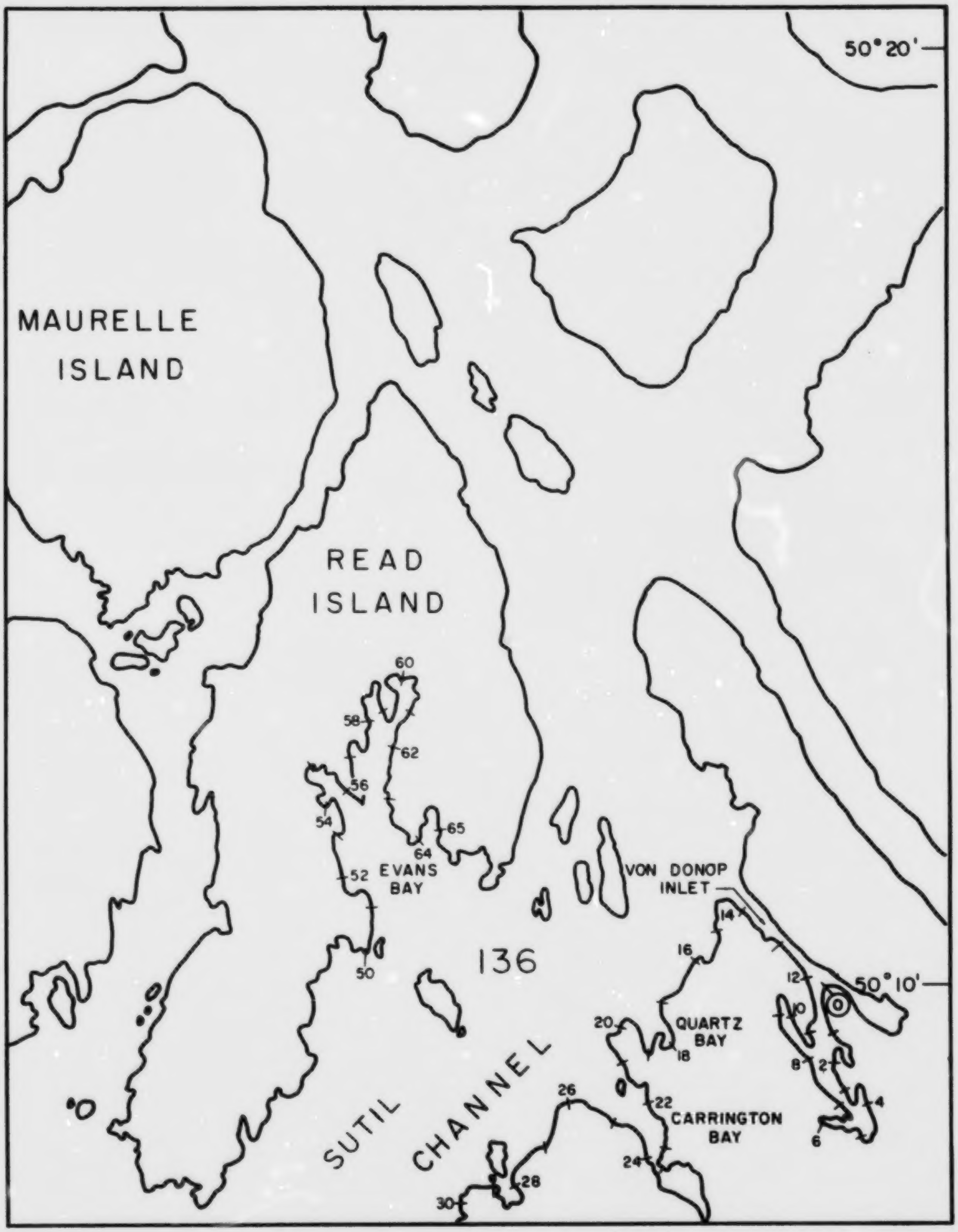

Fig. 136-2. Detailed map of section 136, Other Area 13 Gulf.

Table 136-1. Section 136 - spawn position by year.

```
     1.00     11.00    21.00
      +----+----+----+----+----+-
1937 + a
1938 +aa
1939 +aa
1940 +aa
1941 +aa
1942 + a
1943 + a               aa
1944 +                  a
1945 + a
1946 + b                a
1947 + a                a
1948 +                  a
1949 +
1950 +                  a    a
1951 + b
1952 + a
1953 +
1954 +
1955 +
1956 + 1                      1
1957 +
1958 +               1
1959 +
1960 +                 12     1
1961 +                         3
1962 +
1963 +
1964 +
1965 +
1966 +
1967 +
1968 +
1969 +
1970 +
1971 +
1972 +
1973 +
1974 +
1975 +
1976 +
1977 +
1978 +
1979 +
1980 +
1981 +
1982 +
1983 +
1984 +
1985 +
1986 +
      +----+----+----+----+----+-
     1.00     11.00    21.00

       V                Q    C
       O                U    A
       N                A    R
                        R    R
       D                T    I
       O                Z    N
       N                     G
       O                B    T
       P                A    O
                        Y    N
       I
       N                     B
       L                     A
       E                     Y
       T
```

Table 136-2. Section 136 - histogram of cumulative spawn frequency over distance

```
                          position(km)
                                0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                            0.00 +                                                                           0    0    0    0
                            1.00 +0000                                                                       0    4    0    4
VON DONOP INLET             2.00 +*00000000000000                                                            1   14    0   15
                            3.00 +                                                                           0    0    0    0
                            4.00 +                                                                           0    0    0    0
                            5.00 +                                                                           0    0    0    0
                            6.00 +                                                                           0    0    0    0
                            7.00 +                                                                           0    0    0    0
                            8.00 +                                                                           0    0    0    0
                            9.00 +                                                                           0    0    0    0
                           10.00 +                                                                           0    0    0    0
                           11.00 +                                                                           0    0    0    0
                           12.00 +                                                                           0    0    0    0
                           13.00 +                                                                           0    0    0    0
                           14.00 +                                                                           0    0    0    0
                           15.00 +                                                                           0    0    0    0
                           16.00 +*                                                                          1    0    0    1
                           17.00 +                                                                           0    0    0    0
                           18.00 +*0                                                                         1    1    0    2
QUARTZ BAY                 19.00 +**000000                                                                   2    6    0    8
                           20.00 +                                                                           0    0    0    0
                           21.00 +                                                                           0    0    0    0
                           22.00 +                                                                           0    0    0    0
                           23.00 +                                                                           0    0    0    0
CARRINGTON BAY             24.00 +0                                                                          0    1    0    1
                           25.00 +**                                                                         2    0    0    2
                           26.00 +***                                                                        3    0    0    3
                           27.00 +                                                                           0    0    0    0
                           28.00 +                                                                           0    0    0    0
                           29.00 +                                                                           0    0    0    0
                           30.00 +                                                                           0    0    0    0
                           31.00 +                                                                           0    0    0    0
                           32.00 +                                                                           0    0    0    0
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 136-2 (cont'd.)

```
                    position(km)
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                     33.00 +                                                                               0    0    0    0
                     34.00 +                                                                               0    0    0    0
                     35.00 +                                                                               0    0    0    0
                     36.00 +                                                                               0    0    0    0
                     37.00 +                                                                               0    0    0    0
                     38.00 +                                                                               0    0    0    0
                     39.00 +                                                                               0    0    0    0
                     40.00 +                                                                               0    0    0    0
                     41.00 +                                                                               0    0    0    0
                     42.00 +                                                                               0    0    0    0
                     43.00 +                                                                               0    0    0    0
                     44.00 +                                                                               0    0    0    0
                     45.00 +                                                                               0    0    0    0
                     46.00 +                                                                               0    0    0    0
                     47.00 +                                                                               0    0    0    0
                     48.00 +                                                                               0    0    0    0
                     49.00 +                                                                               0    0    0    0
                     50.00 +                                                                               0    0    0    0
                     51.00 +                                                                               0    0    0    0
                     52.00 +                                                                               0    0    0    0
                     53.00 +                                                                               0    0    0    0
                     54.00 +                                                                               0    0    0    0
                     55.00 +I                                                                              0    0    1    1
                     56.00 +I                                                                              0    0    1    1
EVANS BAY            57.00 +I                                                                              0    0    1    1
                     58.00 +I                                                                              0    0    1    1
                     59.00 +                                                                               0    0    0    0
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 136-3. Herring statistical spawn summary for section 136.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	5270	457	0	9.0	60.0	0.00	60.0	60	60	1	1
1938	1	13908	1206	0	9.0	104.0	0.00	104.0	104	104	1	1
1939	1	13908	1206	0	1.0	99.0	0.00	99.0	99	99	1	1
1940	1	13908	1206	0	7.0	94.0	0.00	94.0	94	94	1	1
1941	1	13908	1206	0	1.0	115.0	0.00	115.0	115	115	1	1
1942	1	796	69	5	1.0	95.0	0.00	95.0	95	95	1	1
1943	2	14749	1279	8	9.0	71.5	1.50	71.3	70	73	2	2
1944	1	265	23	5	1.0	87.0	0.00	87.0	87	87	1	1
1945	1	796	69	3	1.0	104.0	0.00	104.0	104	104	1	1
1946	3	3955	343	7	7.0	80.0	0.00	80.0	80	80	1	2
1947	2	1326	115	6	3.0	71.5	12.50	74.0	59	84	2	2
1948	1	311	27	6	3.0	68.0	0.00	68.0	68	68	1	1
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	2	7899	685	18	5.0	88.5	0.50	88.1	88	89	2	2
1951	2	208	18	5	6.0	87.5	1.50	87.5	86	89	2	1
1952	1	473	41	37	1.0	61.0	0.00	61.0	61	61	1	1
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	1	42761	3708	3	5.0	91.0	0.00	91.0	91	91	1	1
1956	2	2422	210	60	3.0	102.5	2.50	104.6	100	105	2	2
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	1	530	46	1	1.0	102.0	0.00	102.0	102	102	1	1
1959	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1960	3	12962	1124	3	3.7	80.3	2.67	82.8	75	83	2	2
1961	3	6320	548	3	4.3	87.7	1.67	88.5	86	91	2	1
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1964	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1969	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1972	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	31	156674	13586	11	4.4	86.0	2.48	91.2	59	115	23	4

Table 136-4. Spawn summary for section 136 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section centered in the Von Donop Inlet-Carrington Bay vicinity.

B. COMPLETENESS OF RECORDS:

The completeness is uncertain but it is unlikely that all spawning records from 1962 to 1986 are incompleted. Instead, the absense of records since 1962 probably reflects the cessation of spawning.

C. SPAWNING CONSISTENCY OVER TIME: CONSTANT

If pooled among all localities, there has been a nearly constant annual record of spawnings from 1937 to 1961 except for the years, 1949, 1953-54, 1957 and 1959.

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 20/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 20/25 (1937-61)
3. CUMULATIVE SPAWN LENGTH = 13.6 Km.
4. CUMULATIVE SPAWN AREA = 15.7 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 27 (86.0)
2. MEAN WEIGHTED DATE (DOY) = April 1 (91.2)

F. COMMENTS:

No spawns have been recorded since 1962 although there was nearly regular annual spawning before 1962. It is unlikely that all records since 1962 are incomplete. Instead, it appears that herring have stopped spawning in this area but the explanation is unknown.

G. ROE FISHERIES:

No major roe fisheries are documented.

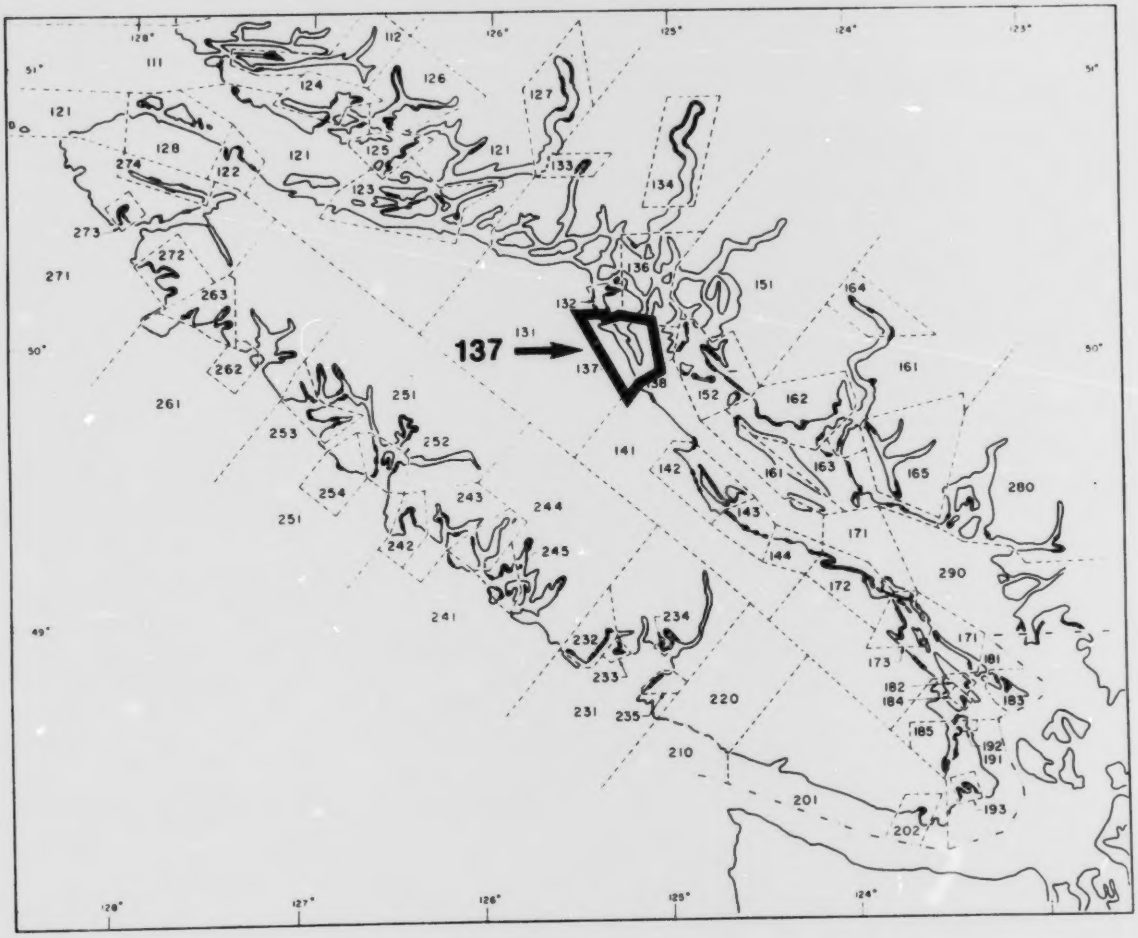

Fig. 137-1. Overview map showing location of section 137, Heriot Bay.

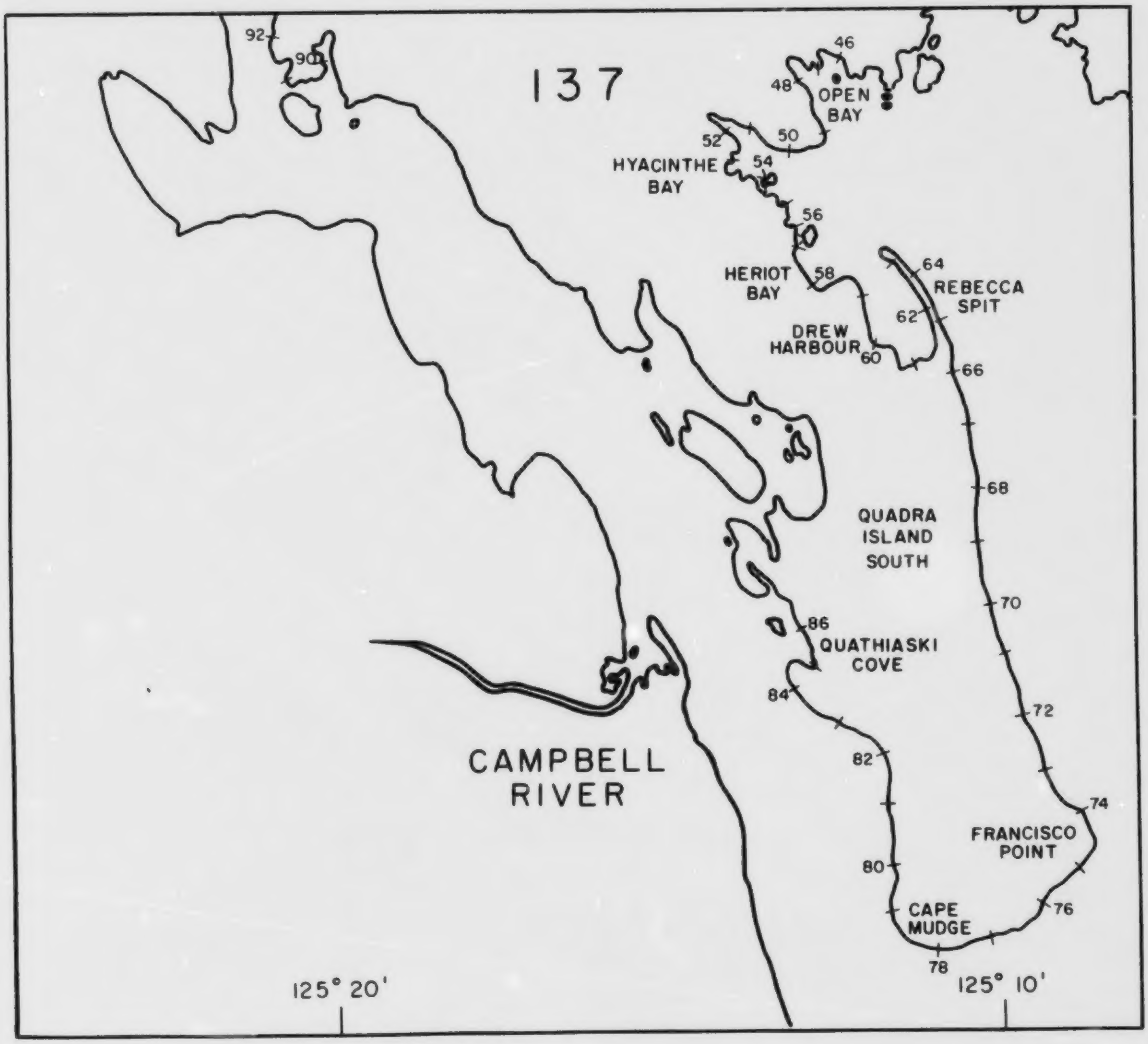

Fig. 137-2. Detailed map of section 137, Heriot Bay.

Table 137-1. Section 137 - Spawn position by year.

```
    46.00     56.00     66.00     76.00
      +----+----+----+----+----+----+----+----+----
1937 +       a
1938 +      aaa
1939 +      aaa
1940 +      aaa
1941 +      aaa
1942 +
1943 +      aa
1944 +
1945 +
1946 +       a
1947 +
1948 +
1949 +
1950 +       b
1951 +       e
1952 +           a
1953 +
1954 +                            caa
1955 +                           bh a
1956 +                            1    1
1957 +
1958 +
1959 +                            111
1960 +      1121 11221    11111111111
1961 +     31  12        1  1111212
1962 +     11  1 1                1
1963 +       2
1964 +   11 1   1              1112111
1965 +     11   11              1 1
1966 +     111    1               11
1967 +     1
1968 +                           2
1969 +     1   211   11           1
1970 +     21
1971 + 1 2311111  1    1
1972 +    11211 1         1   1   1
1973 +     111
1974 +       2
1975 +     1311  1111
1976 +    2 2 1 11    1                     1
1977 +    111 3111   111
1978 +     1 11  121             111
1979 +     11  121 122          111
1980 +     21a 1225 b1 1        abba
1981 +          2               111 211
1982 +     35  1               12221
1983 +               aabaa       ceaaaa
1984 +
1985 +
1986 +

      +----+----+----+----+----+----+----+----+----
    46.00     56.00     66.00     76.00
       O     H   H  D  R Q       SF C       Q
       P     Y   E  R  E U       UR A       U
       E     A   R  E  B A       TA P       A
       N     C   I  W  E D       IN E       T
             I   O     C R       LC         H
       B     N   T  H  C A        I M       I
       A     T      A  A         CS U       A
       Y     H   B  R    I       HC D       S
             E   A  B  S S       AO G       K
                 Y  O  P L       N  E       I
             B      U  I A       NP
             A      R  T N       EO         C
             Y           D       LI         O
                                  N         V
                         S        T         E
                         O
                         U
                         T
                         H
```

Table 137-2. Section 137 - histogram of cumulative spawn frequency over distance

```
                      position(km)
                              0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                        45.00 +                                                                                0    0    0    0
                        46.00 +                                                                                0    0    0    0
OPEN BAY                47.00 +*                                                                               1    0    0    1
                        48.00 +                                                                                0    0    0    0
                        49.00 +***                                                                             3    0    0    3
                        50.00 +********                                                                        8    0    0    8
                        51.00 +**********************                                                         22    0    0   22
                        52.00 +************************00000                                                  24    5    0   29
HYACINTHE BAY           53.00 +***********000000000000000                                                     11   15    0   26
                        54.00 +**********0000                                                                 10    4    0   14
                        55.00 +**********                                                                     10    0    0   10
                        56.00 +**************                                                                 14    0    0   14
HERIOT BAY              57.00 +***********0                                                                   11    1    0   12
                        58.00 +***********                                                                    11    0    0   11
                        59.00 +*****                                                                           5    0    0    5
DREW HARBOUR            60.00 +*****00                                                                         5    2    0    7
                        61.00 +******0                                                                         6    1    0    7
                        62.00 +***0                                                                            3    1    0    4
REBECCA SPIT            63.00 +***00                                                                           3    2    0    5
                        64.00 +0                                                                               0    1    0    1
QUADRA ISLAND SOUTH     65.00 +*0                                                                              1    1    0    2
                        66.00 +**                                                                              2    0    0    2
                        67.00 +*                                                                               1    0    0    1
                        68.00 +**                                                                              2    0    0    2
                        69.00 +**                                                                              2    0    0    2
                        70.00 +***                                                                             3    0    0    3
                        71.00 +****                                                                            4    0    0    4
                        72.00 +*********0                                                                      9    1    0   10
SUTIL CHANNEL           73.00 +**********0000000                                                              10    7    0   17
FRANCISCO POINT         74.00 +*****************000000000000000000                                            17   18    0   35
                        75.00 +******000                                                                       6    3    0    9
CAPE MUDGE              76.00 +*****000                                                                        5    3    0    8
                        77.00 +**0                                                                             2    1    0    3
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
```

Table 137-2 (cont'd.)

```
                        position(km)
                               +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                               0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                        78.00 +*0                                                                              1    1    0    2
                        79.00 +*                                                                               1    0    0    1
                        80.00 +                                                                                0    0    0    0
                        81.00 +                                                                                0    0    0    0
                        82.00 +                                                                                0    0    0    0
                        83.00 +                                                                                0    0    0    0
 QUATHIASKI COVE        84.00 +*                                                                               1    0    0    1
                        85.00 +                                                                                0    0    0    0
                        86.00 +                                                                                0    0    0    0
                               +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                               0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 137-3. Herring statistical spawn summary for section 137.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	5165	457	0	5.0	142.0	0.00	142.0	142	142	1	1
1938	1	13630	1206	0	9.0	92.0	0.00	92.0	92	92	1	1
1939	1	13630	1206	0	9.0	97.0	0.00	97.0	97	97	1	1
1940	1	13630	1206	0	5.0	94.0	0.00	94.0	94	94	1	1
1941	1	13630	1206	0	1.0	105.0	0.00	105.0	105	105	1	1
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	1	12398	1097	11	9.0	102.0	0.00	102.0	102	102	1	1
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	1	520	46	14	3.0	110.0	0.00	110.0	110	110	1	1
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	2	3764	333	4	4.0	106.5	9.50	100.4	97	116	2	1
1951	5	5934	525	10	5.4	86.0	0.00	86.0	86	86	1	1
1952	1	1028	91	2	1.0	104.0	0.00	104.0	104	104	1	1
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	4	7685	680	13	5.0	84.5	1.50	87.8	83	89	2	2
1955	9	21948	1942	17	4.3	89.0	2.02	89.0	74	92	4	2
1956	2	4137	366	69	3.0	103.5	3.50	103.5	100	107	2	2
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	1	20660	1828	14	4.0	77.0	0.00	77.0	77	77	1	1
1960	8	177871	15738	6	5.0	90.3	2.70	81.1	73	94	3	3
1961	9	100712	8911	17	4.8	87.6	2.44	82.5	73	95	7	4
1962	4	4600	407	12	4.0	89.5	4.91	82.0	77	101	3	3
1963	2	1040	92	15	5.0	88.5	6.50	88.5	82	95	2	1
1964	5	76854	6800	8	4.6	80.2	3.83	84.5	65	85	3	2
1965	4	35127	3108	5	5.0	68.8	11.23	73.5	41	96	3	3
1966	4	9302	823	7	3.5	87.8	3.86	86.1	80	97	4	3
1967	1	1028	91	4	1.0	101.0	0.00	101.0	101	101	1	1
1968	2	5176	458	2	2.0	88.0	0.00	88.0	88	88	1	2
1969	7	21078	1865	16	3.6	92.4	5.28	90.5	81	123	5	5
1970	2	7233	640	4	3.5	78.5	1.50	78.3	77	80	2	1
1971	8	49797	4406	6	4.3	95.0	2.46	93.2	85	100	4	4
1972	7	61991	5485	5	5.3	89.9	2.70	94.0	80	104	5	4
1973	1	17563	1554	3	5.0	101.0	0.00	101.0	101	101	1	1
1974	2	2057	182	26	4.0	98.0	15.00	98.0	83	113	2	1
1975	6	49378	4369	27	5.5	90.5	4.34	92.4	80	104	3	3
1976	9	10906	965	27	5.2	94.2	1.34	93.8	90	102	5	3
1977	9	34042	3012	12	3.1	91.9	0.61	92.5	89	94	5	1
1978	6	48666	4306	25	3.7	82.3	0.84	82.6	79	85	4	4
1979	11	36426	3223	19	3.4	88.5	2.25	81.0	73	100	4	4
1980	18	80312	7106	7	4.1	94.9	2.32	82.6	72	108	9	5
1981	8	9403	832	21	0.0	74.9	4.52	78.1	67	103	6	3
1982	9	81815	7239	41	0.0	83.2	2.30	74.3	72	90	4	3
1983	7	120615	10672	47	0.0	75.7	2.21	80.3	70	88	6	3
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	180	1180754	104473	17	4.3	89.0	0.85	85.0	41	142	43	10

Table 137-4. Spawn summary for section 137 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section centered in the Heriot Bay vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete.

C. SPAWNING CONSISTENCY OVER TIME: FREQUENT

There have been two main spawning episodes, 1937-43 and 1959-83 with intermittent spawnings in other years.

D. MAGNITUDE OF SPAWNINGS: SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 38/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 38/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 104.5 Km.
4. CUMULATIVE SPAWN AREA = 118.1 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 30 (89.0)
2. MEAN WEIGHTED DATE (DOY) = March 26 (85.0)

F. COMMENTS:

The herring stock spawning in section 137 may be part of a larger stock centered in section 132. (See comments for that section).

G. ROE FISHERIES:

No major roe fisheries are documented.

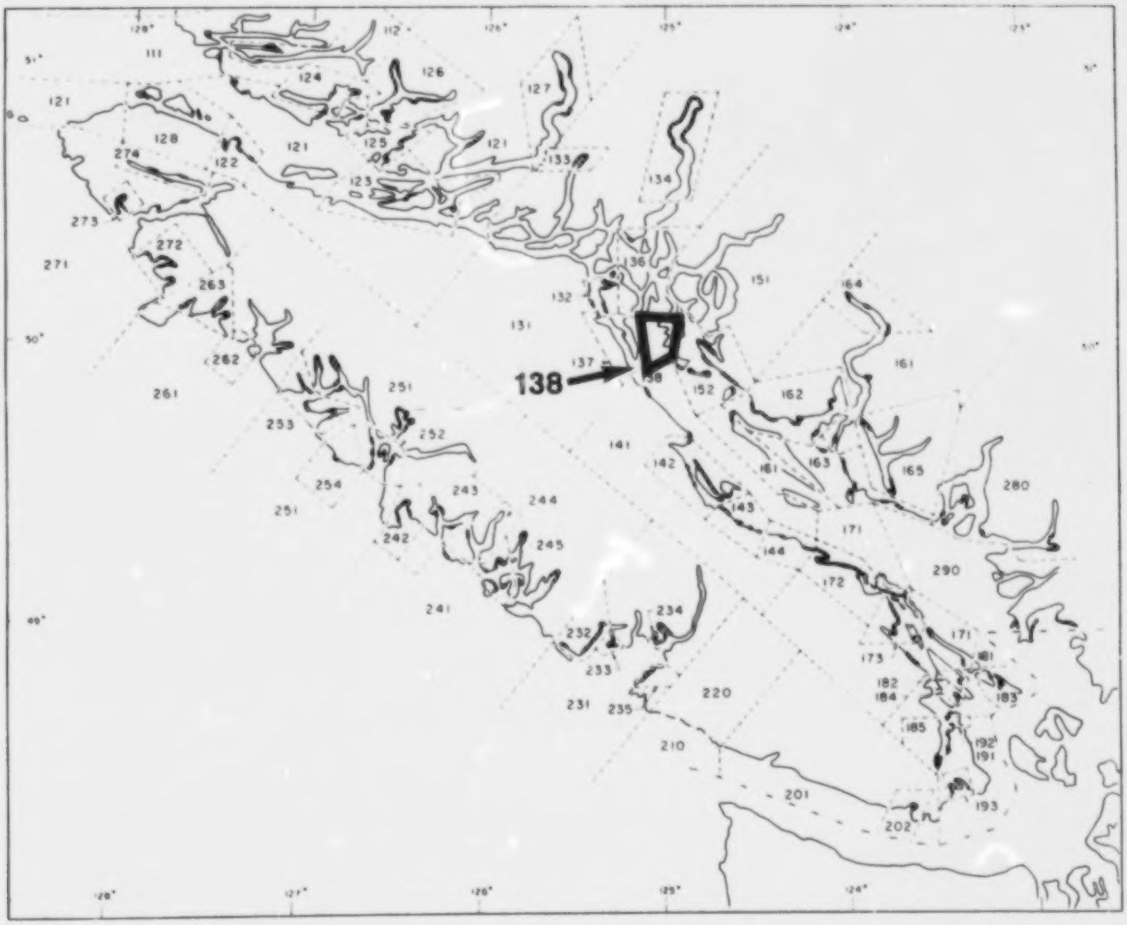

Fig. 138-1. Overview map showing location of section 138, Marina Island.

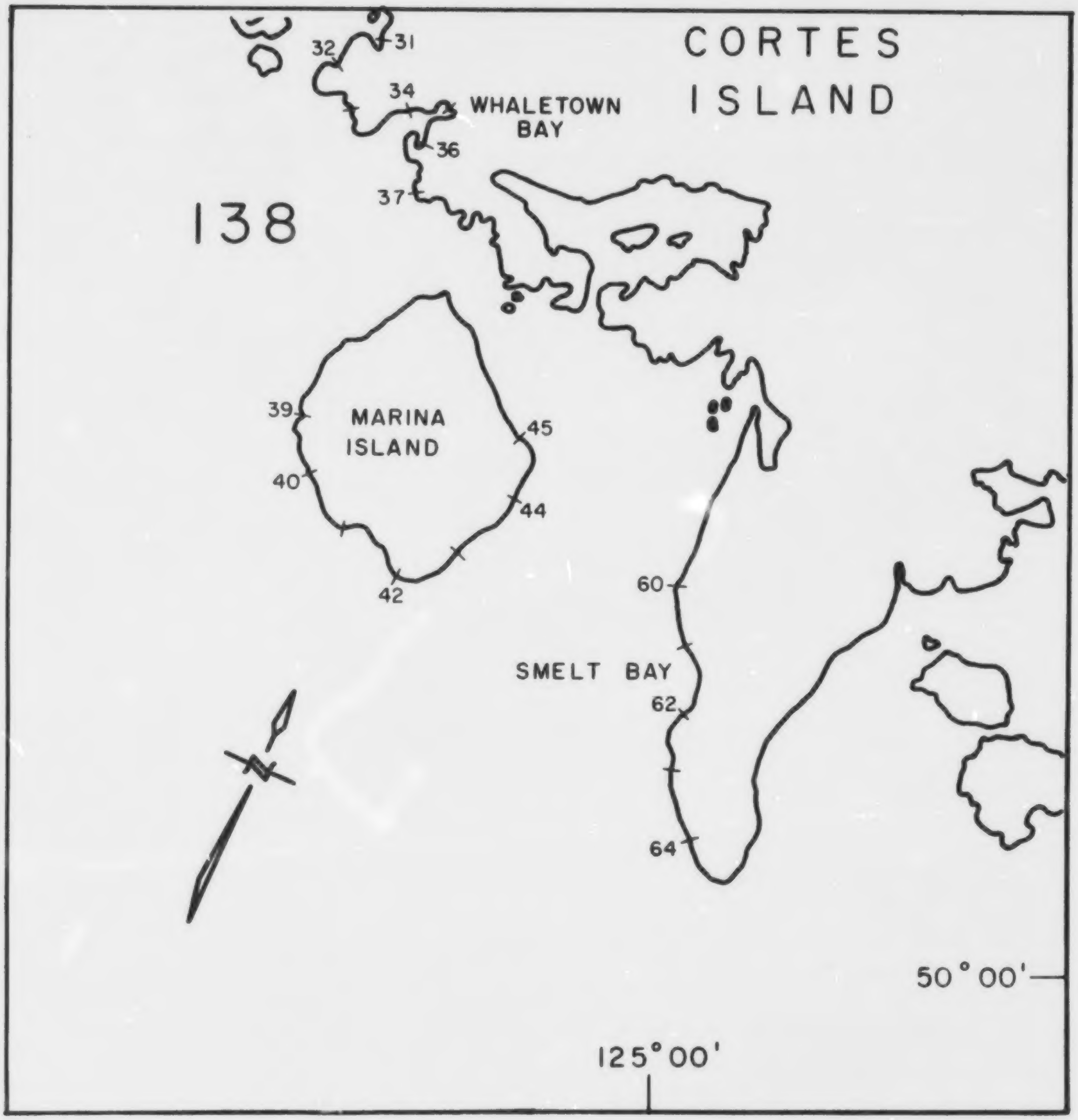

Fig. 138-2. Detailed map of section 138, Marina Island.

Table 138-1. Section 138 - spawn position by year.

```
       34.00
        +---+
   1937 +
   1938 +
   1939 +
   1940 +
   1941 +
   1942 +
   1943 +aa
   1944 +
   1945 +
   1946 +aa
   1947 +
   1948 +
   1949 +
   1950 +
   1951 +
   1952 +
   1953 +
   1954 +
   1955 +
   1956 +
   1957 +
   1958 +
   1959 +
   1960 +
   1961 +
   1962 +
   1963 +
   1964 +
   1965 +    11
   1966 +
   1967 +
   1968 +
   1969 + 1
   1970 +
   1971 +
   1972 +
   1973 +
   1974 +
   1975 +
   1976 +
   1977 +
   1978 +
   1979 +
   1980 +
   1981 +
   1982 +
   1983 +
   1984 +
   1985 +
   1986 +
        +---+
       34.00
          W
          H
          A
          L
          E
          T
          O
          W
          N

          B
          A
          Y
```

Table 138-2. Section 138 - histogram of cumulative spawn frequency over distance

```
                     position(km)
                          0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                          +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                    33.00 +                                                                              0    0    0    0
                    34.00 +00                                                                            0    2    0    2
WHALETOWN BAY       35.00 +*00                                                                           1    2    0    3
                    36.00 +                                                                              0    0    0    0
                    37.00 +                                                                              0    0    0    0
                    38.00 +*                                                                             1    0    0    1
                    39.00 +*                                                                             1    0    0    1
                    40.00 +*                                                                             1    0    0    1
MARINA ISLAND       41.00 +*0                                                                            1    1    0    2
                    42.00 +*                                                                             1    0    0    1
                    43.00 +*                                                                             1    0    0    1
                    44.00 +*                                                                             1    0    0    1
                    45.00 +                                                                              0    0    0    0
                    46.00 +                                                                              0    0    0    0
                    47.00 +                                                                              0    0    0    0
                    48.00 +                                                                              0    0    0    0
                    49.00 +                                                                              0    0    0    0
                    50.00 +                                                                              0    0    0    0
                    51.00 +                                                                              0    0    0    0
                    52.00 +                                                                              0    0    0    0
                    53.00 +                                                                              0    0    0    0
                    54.00 +                                                                              0    0    0    0
                    55.00 +                                                                              0    0    0    0
                    56.00 +                                                                              0    0    0    0
                    57.00 +                                                                              0    0    0    0
                    58.00 +                                                                              0    0    0    0
                    59.00 +                                                                              0    0    0    0
                    60.00 +                                                                              0    0    0    0
                    61.00 +I                                                                             0    0    1    1
SMELT BAY           62.00 +I                                                                             0    0    1    1
                    63.00 +                                                                              0    0    0    0
                          +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                          0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 138-3. Herring statistical spawn summary for section 138.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	1	3624	366	9	9.0	70.0	0.00	70.0	70	70	1	1
1944	1	456	46	5	1.0	55.0	0.00	55.0	55	55	1	1
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	1	901	91	9	7.0	80.0	0.00	80.0	80	80	1	1
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1960	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1961	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1964	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1965	1	56120	5667	5	7.0	81.0	0.00	81.0	81	81	1	1
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1969	1	901	91	5	5.0	66.0	0.00	66.0	66	66	1	1
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	1	2713	274	3	3.0	81.0	0.00	81.0	81	81	1	1
1972	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	6	64716	6535	6	5.3	72.2	4.30	80.0	55	81	5	3

Table 138-4. Spawn summary for section 138 from 1937 to 1986.

A. GENERAL:

There are two main spawning areas in this section:
(i) Whaletown Bay and
(ii) Smelt Bay

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Campbell River.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There has been only six recorded spawnings, 1943, 1944, 1946, 1965, 1969 and 1971

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 6/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 6/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 6.5 Km.
4. CUMULATIVE SPAWN AREA = 6.5 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 13 (72.2)
2. MEAN WEIGHTED DATE (DOY) = March 21 (80.0)

F. COMMENTS:

Section 138 is not a significant herring spawning area. The infrequent spawnings may be derived from herring centered in section 132.

G. ROE FISHERIES:

No major roe fisheries are documented.

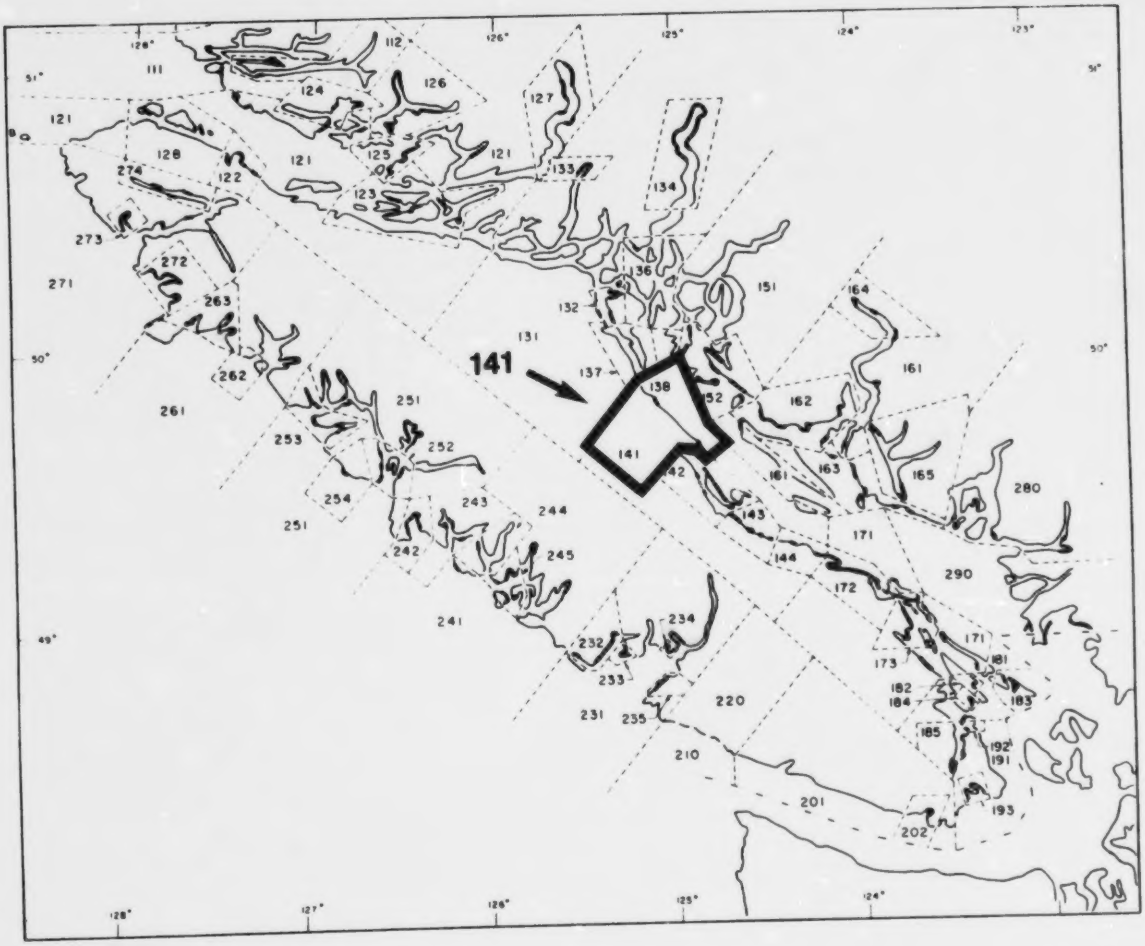

Fig. 141-1. Overview map showing location of section 141, Other Area 14.

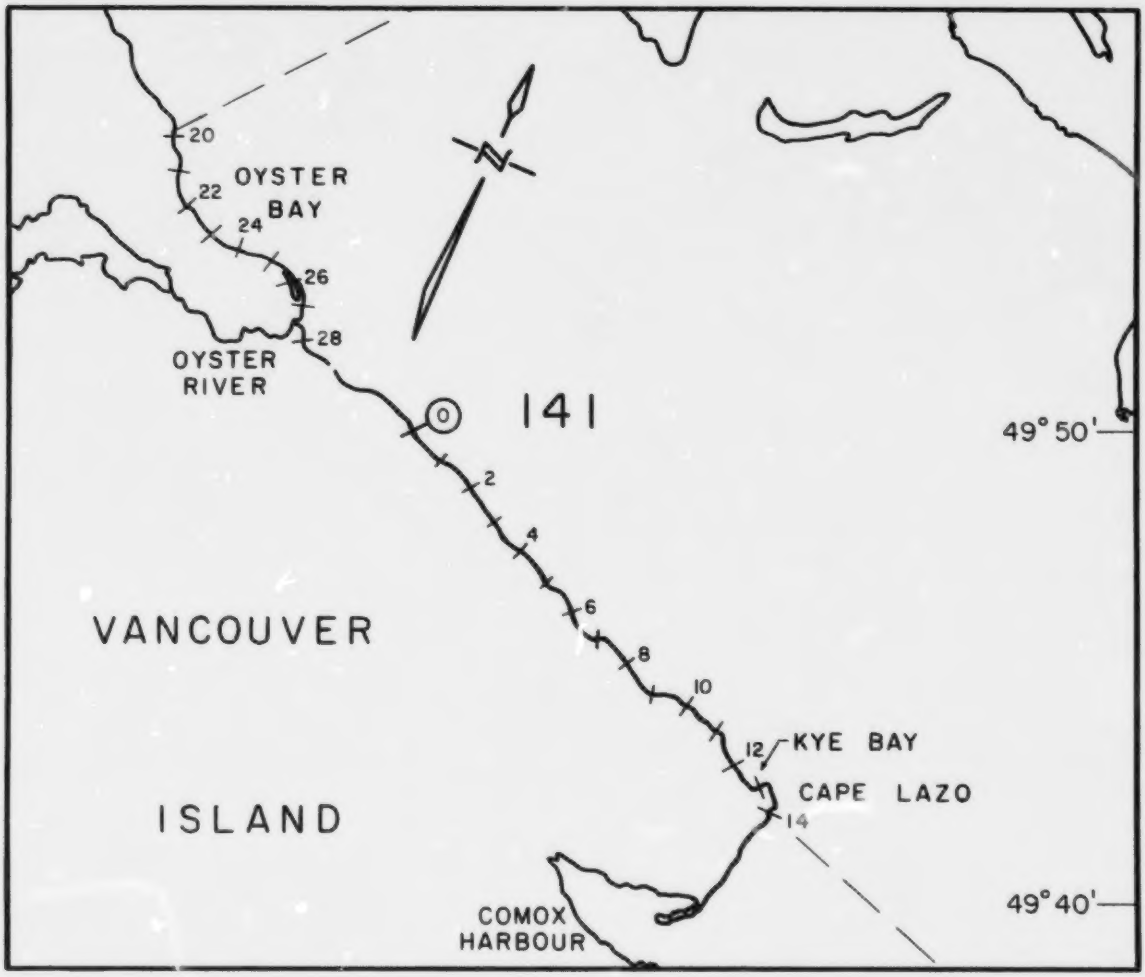

Fig. 141-2. Detailed map of section 141, Other Area 14.

Table 141-1. Section 141 - spawn position by year.

```
     0.00     10.00     20.00
      +----+----+----+----+----
1937 +
1938 +
1939 +          aaa
1940 +
1941 +        aaddca
1942 +
1943 +          aaa
1944 +
1945 +
1946 +          aaa
1947 +
1948 +
1949 +         aaaaa
1950 +         aaaa
1951 +
1952 +
1953 +
1954 +            1111
1955 +         1111
1956 +
1957 +
1958 +
1959 +           211
1960 +
1961 +
1962 +
1963 +
1964 +
1965 +
1966 +
1967 +
1968 +
1969 +
1970 +
1971 +
1972 +
1973 +
1974 +
1975 +
1976 +
1977 +
1978 +
1979 +
1980 +
1981 +
1982 +1112111   121321
1983 +           11111       1
1984 +
1985 +
1986 +
      +----+----+----+----+----
     0.00     10.00     20.00
                 C           O
                 A           Y
                 P           S
                 E           T
                             E
                 L           R
                 A
                 Z           B
                 O           A
                 /           Y
```

Table 141-2. Section 141 - histogram of cumulative spawn frequency over distance

```
                         position(km)
                               0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                               +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                          0.00 +*                                                                               1    0    0    1
                          1.00 +*                                                                               1    0    0    1
                          2.00 +*                                                                               1    0    0    1
                          3.00 +**                                                                              2    0    0    2
                          4.00 +*                                                                               1    0    0    1
                          5.00 +*                                                                               1    0    0    1
                          6.00 +*                                                                               1    0    0    1
                          7.00 +0                                                                               0    1    0    1
                          8.00 +00                                                                              0    2    0    2
                          9.00 +*0000                                                                           1    4    0    5
                         10.00 +**0000000000                                                                    2   10    0   12
CAPE LAZO   /KYE BAY     11.00 +******0000000000                                                                6   10    0   16
                         12.00 +*****000000000                                                                  5    9    0   14
                         13.00 +******000                                                                       6    3    0    9
                         14.00 +****0                                                                           4    1    0    5
                         15.00 +***0                                                                            3    1    0    4
                         16.00 +                                                                                0    0    0    0
                         17.00 +                                                                                0    0    0    0
                         18.00 +                                                                                0    0    0    0
                         19.00 +                                                                                0    0    0    0
                         20.00 +                                                                                0    0    0    0
                         21.00 +                                                                                0    0    0    0
                         22.00 +                                                                                0    0    0    0
OYSTER BAY               23.00 +*                                                                               1    0    0    1
                         24.00 +                                                                                0    0    0    0
                         25.00 +                                                                                0    0    0    0
                               +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                               0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 141-3. Herring statistical spawn summary for section 141.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	2	516862	3218	0	3.0	89.0	6.00	89.0	83	95	2	2
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	5	1679562	10457	0	4.2	95.0	5.81	98.0	80	107	5	2
1942	1	29393	183	32	1.0	70.0	0.00	70.0	70	70	1	1
1943	2	1062796	6617	64	4.0	85.0	1.00	84.5	84	86	2	2
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	1	193703	1206	64	9.0	78.0	0.00	78.0	78	78	1	1
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	1	734015	4570	46	9.0	71.0	0.00	71.0	71	71	1	1
1950	1	513811	3199	27	7.0	85.0	0.00	85.0	85	85	1	1
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	1	440409	2742	229	9.0	57.0	0.00	57.0	57	57	1	1
1955	1	499195	3108	23	6.0	75.0	0.00	75.0	75	75	1	1
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	2	337615	2102	87	6.0	80.0	0.00	80.0	80	80	1	2
1960	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1961	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1964	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1969	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1972	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	8	1966904	12246	64	0.0	66.3	2.62	64.5	61	83	4	1
1983	3	369417	2300	28	0.0	67.7	8.67	63.0	59	85	2	3
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	28	8343681	51948	63	5.2	76.9	2.67	78.3	57	107	18	4

Table 141-4. Spawn summary for section 141 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section centered in the Cape Lazo-Kye Bay vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Oyster River and Cape Lazo.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There have been intermittent spawnings from 1939-59 and 1982-83 with no recorded spawnings in other years.

D. MAGNITUDE OF SPAWNINGS: LARGE

1. NUMBER OF SPAWN YEARS/50 YEARS = 12/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 12/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 52.0 Km.
4. CUMULATIVE SPAWN AREA = 834.4 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 18 (76.9)
2. MEAN WEIGHTED DATE (DOY) = March 19 (78.3)

F. COMMENTS:

For the most part, section 141 is not a major herring spawning site, although in several years (1941, 1943, 1982) there were very large spawn depositions. Probably, herring spawning in section 141 originate from Lambert Channel, the major spawning site to the immediate south.

G. ROE FISHERIES:

No major roe fisheries are documented.

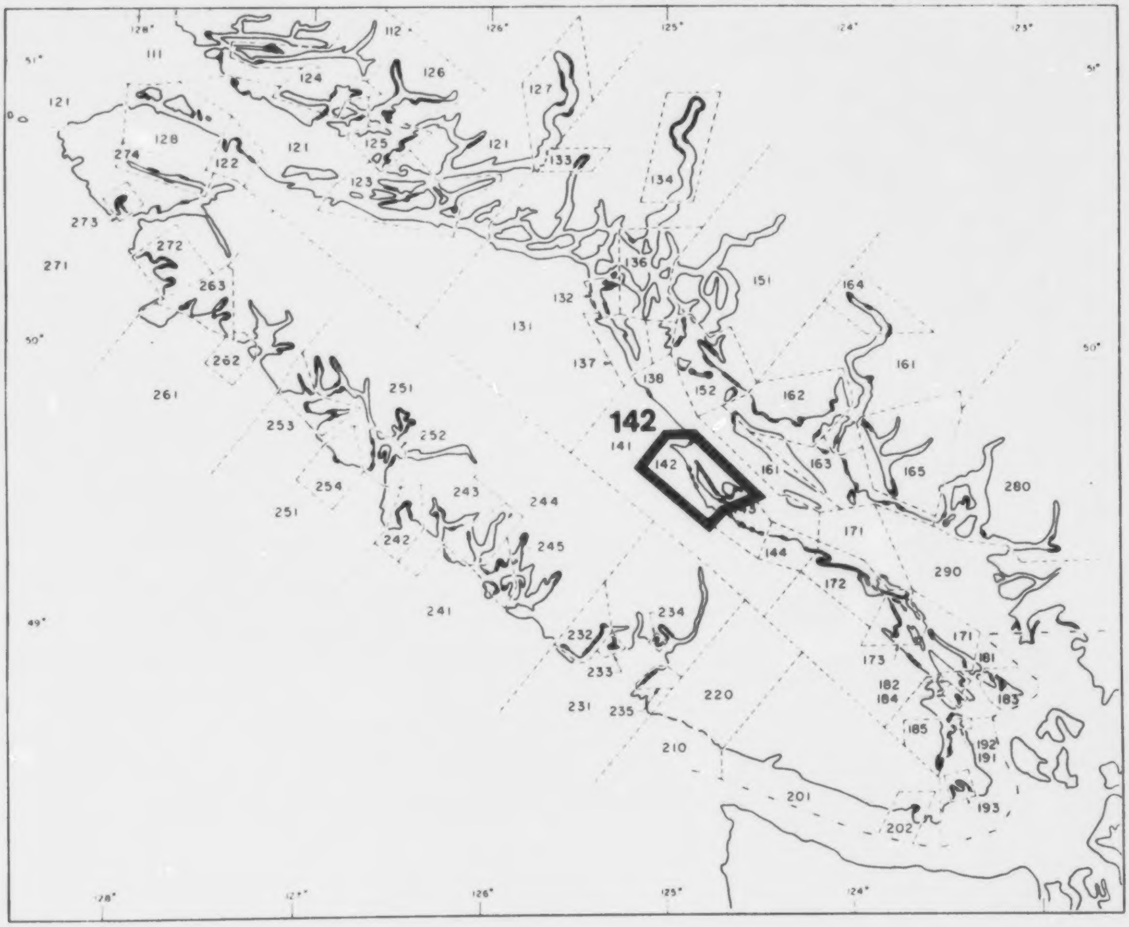

Fig. 142-1. Overview may showing location of section 142, Baynes Sound.

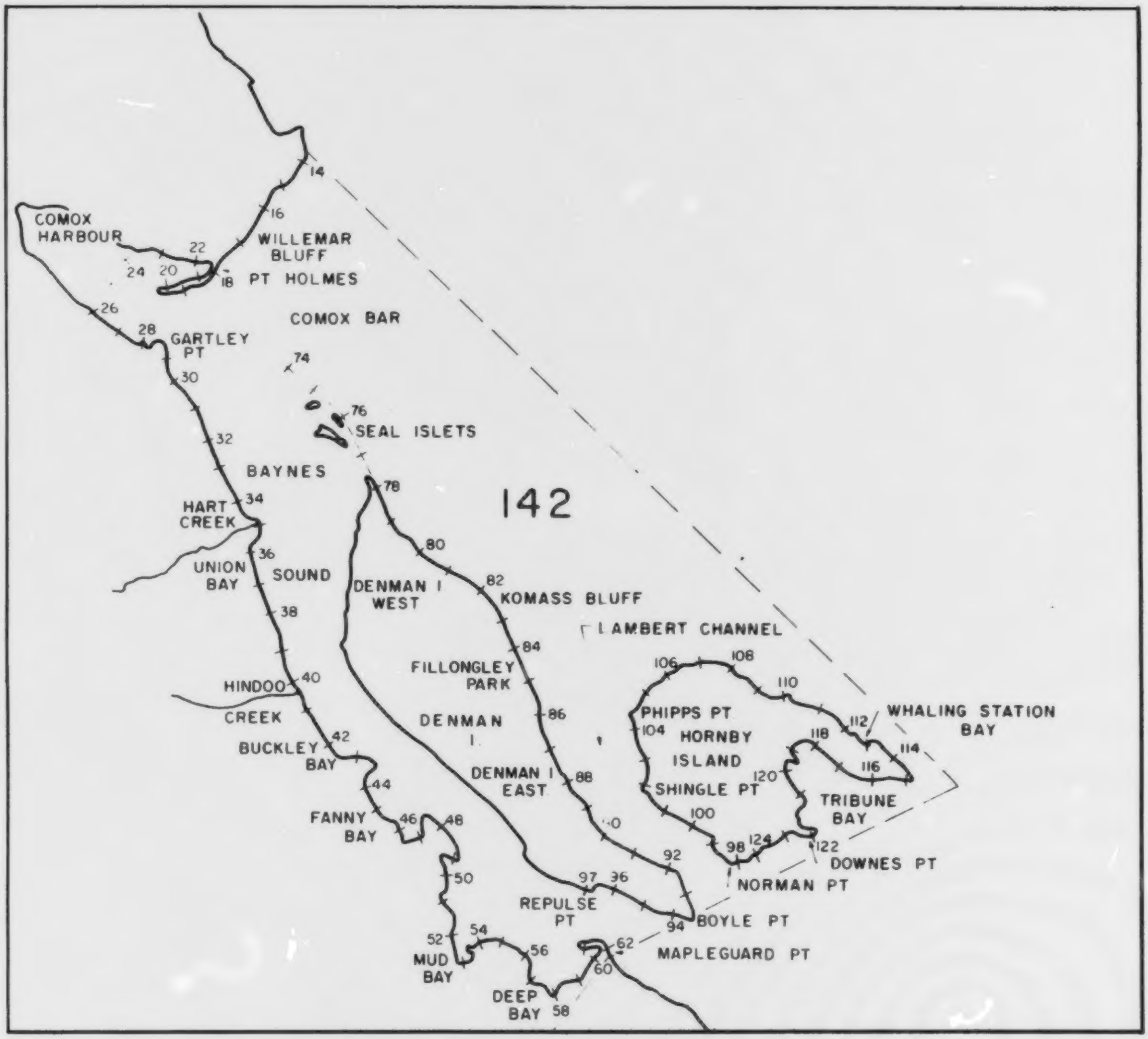

Fig. 142-2. Detailed map of section 142, Baynes Sound.

```
Table 142-1.  Section 142 - spawn position by year.
        14.00     24.00     34.00     44.00     54.00     64.00     74.00     84.00     94.00    104.00    114.00
          +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
    1937 +       abba                ^^                   a                                      ^^^^     a
    1938 +                     bb      bb                cc                   abbbcbaaaa
    1939 +        aa     aba                            acca                    aaaaa
    1940 +       abba                                    bb
    1941 +        aa           aa                        aa            aa       aaaaa
    1942 +                           ^^               aaaccaaa                   aaa              ^^
    1943 +        bb                                    aaaa               bbbbeecccaa          aaaaaaaaa
    1944 +       aeea     b    aa                         a
    1945 +                                                                                       ^^^^
    1946 +        aa      a                   aaa       acca                   bbaaaaa
    1947 +                a          ^^bba              adda
    1948 +        bb     aba                             aaa                   aa           ^^     aa
    1949 +              aba    bb                                             aaaa            ^^^^^^^^^^
    1950 +             aaaaa                                                 aabbaa         ^^
    1951 +  11          1111                                          112111111111111         11121211
    1952 +          11  1  1  1 11                                      11111111111              1
    1953 +   11   1     1       1111111                                1111112221111111
    1954 +        1 1      1                           11              22111     1 11             111
    1955 +   11   22     2 1                             111                 11
    1956 +       11111    1  1111   1                     1                                      111
    1957 +         1                                     111
    1958 +                   3                             11                      1
    1959 +    11    1      333                            1                   11  12             $
    1960 +    33   1111  111111111  1                  1
    1961 +     11222 2   112211 1             22
    1962 +    11   2321 112211                           11
    1963 +      1 15           12
    1964 +      1  232221211221111  11
    1965 +      1  22122 231111 1 2121 11                                          11
    1966 +        121
    1967 +        111                                   11
    1968 +
    1969 +
    1970 +
    1971 +                     131
    1972 +                        11
    1973 +
    1974 +                        111                  1   11
    1975 +                      1 1111                   1111                   111122111111111
    1976 +                  1   1     1
    1977 +      11 11   11121121321121             111    121               13332132
    1978 +  1   11121111111     11121                                 22221 112131    211            1     11
    1979 + 11 1111                                       1211         111112211121111 1
    1980 + 122111   11   11111                          abbaa          12211211121112              1122111111
    1981 + 11221   22   11222                                         12533 112121411   1
    1982 +   21    11 1                                  2311          11   1121311331121
    1983 +                                                             aa   bdbabbdcdc       ^^ add
    1984 +       bb                                       a                    aaaa         ^^^^aaa           a
    1985 +                                                                  cccadda    bb        a  a
    1986 +                                                                  cccaaaaca bbba  ^^^^acb      aba
          +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
        14.00     24.00     34.00     44.00     54.00     64.00     74.00     84.00     94.00    104.00    114.00
             W   C C     GB  H U    H ~ F      M         D M           S     K D  FLDO B     ~~  S ~P     W
             I   O O     AA  A N    I B A      U         E A           E     O E  IAEE O     RN  H HH     H
             L   M M     RY  R I    N U N      D         E P           A     M N  LMNN Y     EO  I OI     A
             L   O O     TN  T O    D C N                P L           L     A M  LBMM L     PR  N RP     L
             E   X X     LE    N    O K Y      B           E                 S A  OEAA E     UM  G NP     I
             M           ES  C      O L        A         B G           I       N  NRNN       LA  L BS     N
             A   B H     Y   R B      E B      Y         A U           S     B    GT   P     SN  E Y      G
             R   A A      S  E A    C Y A                Y A           L     L I  L II O     E      P
                 R R     PO  E Y    R   Y      -           R           E     U S  ECSS I      P  S IO     S
             B     B     OU  K      E B                    D           T     F L  YHLL N     PO  P SI     T
             L     O     IN         E A        B                       S     F A   AAA T     OI  I LN     A
             U     U     ND         K Y        A           P                   N  PNNN       IN  T AT     T
             /     R     T                     Y           T                   D  ANDD       NT    N      I
```

Table 142-1 (cont'd). Section 142 - spawn position by year.

```
  114.00
     +----+--
1937 +
1938 +
1939 +
1940 +
1941 +
1942 +
1943 + aaaaaaa
1944 +
1945 +
1946 +
1947 +
1948 +
1949 +
1950 +
1951 +
1952 +
1953 +
1954 +
1955 +
1956 +
1957 +
1958 +
1959 +
1960 +
1961 +
1962 +
1963 +
1964 +
1965 +
1966 +
1967 +
1968 +
1969 +
1970 +
1971 +
1972 +
1973 +
1974 +
1975 +
1976 +
1977 +      11
1978 +     11
1979 +
1980 +
1981 +    21
1982 +
1983 +
1984 +aaaaaaaa
1985 +
     +----+--
  114.00
          TD
          RO
          IW
          BN
          UE
          NS
          E
           P
          BO
          AI
          YN
           T
```

Table 142-2. Section 142 - histogram of cumulative spawn frequency over distance

```
                          position(km)
                                0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                          13.00 +                                                                               0    0    0    0
                          14.00 +                                                                               0    0    0    0
                          15.00 +***                                                                            3    0    0    3
                          16.00 +******                                                                         6    0    0    6
WILLEMAR BLU/PT. HOLMES   17.00 +*********                                                                      9    0    0    9
                          18.00 +*************                                                                 13    0    0   13
                          19.00 +*********                                                                      9    0    0    9
                          20.00 +*********                                                                      9    0    0    9
COMOX BAR                 21.00 +******000000                                                                   6    6    0   12
                          22.00 +***********0000000000000000000                                                11   19    0   30
COMOX HARBOUR             23.00 +*************************00000000000000000                                    25   17    0   42
                          24.00 +***********************0000                                                   23    4    0   27
                          25.00 +**********                                                                    10    0    0   10
                          26.00 +********                                                                       8    0    0    8
                          27.00 +*****0                                                                         5    1    0    6
                          28.00 +********0000                                                                   8    4    0   12
GARTLEY POINT             29.00 +**************00000000                                                        14    8    0   22
BAYNES SOUND              30.00 +***************0000000000000                                                  15   13    0   28
                          31.00 +*******************000000                                                     19    6    0   25
                          32.00 +***************00                                                             15    2    0   17
HART CREEK                33.00 +***************                                                               15    0    0   15
                          34.00 +********                                                                       8    0    0    8
UNION BAY                 35.00 +******000000                                                                   6    6    0   12
                          36.00 +******************000000                                                      18    6    0   24
                          37.00 +********                                                                       8    0    0    8
                          38.00 +********                                                                       8    0    0    8
                          39.00 +********                                                                       8    0    0    8
HINDOO CREEK              40.00 +***********                                                                   11    0    0   11
                          41.00 +*****III                                                                       5    0    3    8
 BUCKLEY BAY              42.00 +**III                                                                          2    0    3    5
                          43.00 +*0000                                                                          1    4    0    5
FANNY BAY                 44.00 +*0000                                                                          1    4    0    5
                          45.00 +0                                                                              0    1    0    1
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

```
Table 142-2 (cont'd.)

                        position(km)
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                        46.00 +                                                                                 0    0    0    0
                        47.00 +                                                                                 0    0    0    0
                        48.00 +                                                                                 0    0    0    0
                        49.00 +                                                                                 0    0    0    0
                        50.00 +**0                                                                              2    1    0    3
MUD BAY - BAYNES SOUND  51.00 +**0                                                                              2    1    0    3
                        52.00 +0                                                                                0    1    0    1
                        53.00 +                                                                                 0    0    0    0
                        54.00 +                                                                                 0    0    0    0
                        55.00 +*                                                                                1    0    0    1
                        56.00 +*0                                                                               1    1    0    2
                        57.00 +*0                                                                               1    1    0    2
                        58.00 +00                                                                               0    2    0    2
                        59.00 +***00                                                                            3    2    0    5
                        60.00 +**00000000                                                                       2    8    0   10
DEEP BAY                61.00 +*******00000000000000000000000000                                                7   26    0   33
                        62.00 +************00000000000000000000000000000                                       12   29    0   41
MAPLEGUARD PT.          63.00 +*********000000000                                                               9    9    0   18
                        64.00 +*******000                                                                       7    3    0   10
                        65.00 +00                                                                               0    2    0    2
                        66.00 +0                                                                                0    1    0    1
                        67.00 +0                                                                                0    1    0    1
                        68.00 +                                                                                 0    0    0    0
                        69.00 +                                                                                 0    0    0    0
                        70.00 +                                                                                 0    0    0    0
                        71.00 +                                                                                 0    0    0    0
                        72.00 +                                                                                 0    0    0    0
                        73.00 +                                                                                 0    0    0    0
                        74.00 +*****                                                                            5    0    0    5
SEAL ISLETS             75.00 +***********00                                                                   11    2    0   13
                        76.00 +*****************00                                                             17    2    0   19
                        77.00 +************                                                                    12    0    0   12
                        78.00 +**********                                                                      10    0    0   10
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 142-2 (cont'd.)

```
                          position(km)
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varb varc  all
                           79.00 +********00                                                                   8    2    0   10
                           80.00 +***********000000000000                                                     11   12    0   23
KOMAS BLUFF                81.00 +**************000000000000000                                               14   15    0   29
                           82.00 +****************000000000000000                                             16   15    0   31
DENMAN ISLAND              83.00 +***************000000000000000000000                                        15   21    0   36
                           84.00 +****************00000000000000000000000000000                               16   29    0   45
FILLONGLEY PARK            85.00 +***********00000000000000000000000                                          11   23    0   34
LAMBERT CHANNEL            86.00 +*****************00000000000000000000000                                    17   23    0   40
DENMAN ISLAND (EAST)       87.00 +****************0000000000000000000                                         16   19    0   35
DENMAN ISLAND (WEST)       88.00 +***********000000000000                                                     11   12    0   23
                           89.00 +****000000                                                                   4    6    0   10
                           90.00 +*******000                                                                   7    3    0   10
BOYLE POINT                91.00 +***00000                                                                     3    5    0    8
                           92.00 +***0000                                                                      3    4    0    7
                           93.00 +*0                                                                           1    1    0    2
                           94.00 +*                                                                            1    0    0    1
                           95.00 +*                                                                            1    0    0    1
                           96.00 +*IIII                                                                        1    0    4    5
 REPULSE POINT             97.00 +*IIIIIIIIII                                                                  1    0   10   11
 NORMAN POINT              98.00 +**IIIIIIIII                                                                  2    0    9   11
                           99.00 +*III                                                                         1    0    3    4
                          100.00 +*0000I                                                                       1    4    1    6
SHINGLE SPIT              101.00 +******00000000000III                                                         6   11    3   20
                          102.00 +***00000000IIIIIII                                                           3    8    7   18
 HORNBY ISLAND            103.00 +*****00IIIIIII                                                               5    2    7   14
PHIPPS POINT              104.00 +***000III                                                                    3    3    3    9
                          105.00 +****0I                                                                       4    1    1    6
                          106.00 +**0I                                                                         2    1    1    4
                          107.00 +*0I                                                                          1    1    1    3
                          108.00 +*0                                                                           1    1    0    2
                          109.00 +*0                                                                           1    1    0    2
WHALING STATION BAY       110.00 +*000                                                                         1    3    0    4
                          111.00 +**0                                                                          2    1    0    3
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varb varc  all
```

Table 142-2 (cont'd.)

```
                    position(km)
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                    112.00 +**                                                                            2    0    0    2
                    113.00 +                                                                              0    0    0    0
                    114.00 +0                                                                             0    1    0    1
                    115.00 +00                                                                            0    2    0    2
                    116.00 +00                                                                            0    2    0    2
                    117.00 +00                                                                            0    2    0    2
                    118.00 +**00                                                                          2    2    0    4
TRIBUNE BAY         119.00 +**00                                                                          2    2    0    4
DOWNES POINT        120.00 +**00                                                                          2    2    0    4
                    121.00 +*00                                                                           1    2    0    3
                    122.00 +00                                                                            0    2    0    2
                    123.00 +0                                                                             0    1    0    1
                    124.00 +0                                                                             0    1    0    1
                    125.00 +                                                                              0    0    0    0
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 142-3. Herring statistical spawn summary for section 142.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	7	780571	9780	0	6.1	86.0	3.98	82.8	67	98	6	5
1938	12	1168462	14640	8	4.8	85.6	3.29	86.3	66	97	9	6
1939	7	866610	10858	0	7.0	72.3	4.98	75.6	58	93	6	4
1940	4	577766	7239	0	5.5	86.3	6.55	87.3	67	95	4	2
1941	5	571940	7166	0	3.4	66.4	1.69	63.0	62	70	4	5
1942	8	1167265	14625	80	4.8	73.3	5.31	77.8	44	91	8	4
1943	10	3452631	43259	72	3.8	71.0	5.32	74.6	47	96	8	6
1944	9	624218	7821	60	4.8	65.6	4.37	74.0	46	83	8	4
1945	1	291796	3656	64	3.0	94.0	0.00	94.0	94	94	1	1
1946	8	1348042	16890	64	7.0	75.5	2.75	80.8	69	91	5	6
1947	8	948498	11884	3	6.3	60.4	1.35	60.7	55	64	5	4
1948	8	744097	9323	39	4.8	71.8	4.64	67.0	59	95	7	6
1949	6	1276609	15995	23	6.0	74.2	4.62	72.0	67	97	5	4
1950	4	941075	11791	17	6.0	77.5	4.25	74.1	69	89	4	3
1951	9	1955020	24495	74	6.7	77.6	1.54	77.1	73	88	6	8
1952	7	1014104	12706	58	6.3	75.7	2.63	72.8	67	88	7	6
1953	8	1736172	21753	63	5.0	64.8	3.10	65.5	56	80	7	7
1954	10	791426	9916	106	4.9	67.8	3.38	69.2	54	84	8	7
1955	10	445676	5584	104	5.2	85.4	4.48	81.8	69	119	10	6
1956	11	513038	6428	78	3.6	89.4	4.59	81.8	71	107	6	8
1957	3	153241	1920	32	3.0	89.0	13.00	81.6	76	115	2	2
1958	5	113095	1417	52	4.2	76.4	6.01	80.4	69	100	3	3
1959	12	911944	11426	44	3.7	80.3	4.03	80.6	63	101	8	6
1960	9	1101420	13800	58	3.7	75.4	3.98	69.7	63	96	6	6
1961	11	1145317	14350	56	3.0	81.1	3.59	77.5	72	104	7	4
1962	11	849929	10649	66	4.0	76.3	3.41	72.4	61	91	10	4
1963	9	291796	3656	44	3.2	75.4	5.63	75.0	58	100	7	2
1964	16	1123368	14075	61	4.6	67.5	1.87	68.1	60	79	8	5
1965	18	1075879	13480	45	4.9	68.7	1.53	68.7	57	77	11	6
1966	2	109424	1371	183	1.0	61.5	1.50	61.0	60	63	2	1
1967	2	291796	3656	115	4.0	76.0	16.00	68.0	60	92	2	2
1968	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1969	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	4	116687	1462	36	1.5	81.5	5.50	80.1	76	98	2	1
1972	1	36475	457	69	3.0	83.0	0.00	83.0	83	83	1	1
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	3	182373	2285	44	3.3	95.7	18.19	88.0	76	132	3	2
1975	7	1553879	19469	33	4.3	96.7	9.75	87.7	65	132	5	4
1976	3	53155	666	8	3.3	130.7	0.33	130.2	130	131	2	3
1977	23	2493279	31239	53	4.4	86.5	3.40	84.6	66	134	8	12
1978	17	2331178	29208	99	4.8	73.9	5.39	70.8	59	148	10	12
1979	10	1699698	21296	521	0.0	66.0	1.35	65.7	60	70	5	7
1980	15	3089641	38711	144	5.3	68.7	0.99	68.0	64	77	7	11
1981	28	1982396	24838	110	0.0	64.0	0.44	64.5	61	67	4	10
1982	19	1643589	20593	133	0.0	66.0	1.80	63.6	57	83	10	9
1983	17	2007297	25150	74	0.0	64.8	1.72	62.8	58	77	5	7
1984	7	1664261	20852	105	0.0	72.6	1.66	69.8	68	79	5	6
1985	12	1328887	16650	45	0.0	67.6	1.33	66.4	66	82	3	6
1986	24	3278718	41080	61	0.0	72.7	0.52	72.0	68	76	5	10
All	440	51843736	649565	81	4.7	74.3	0.70	72.9	44	148	65	33

Table 142-4. Spawn summary for section 142 from 1937 to 1986.

A. GENERAL:

There are four main spawning areas in the Denman-Hornby Island section:

(i) Comox Bar-Baynes Sound
(ii) Mapleguard Point
(iii) Komass Bluff and
(iv) Phipps Point

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Comox, Courtenay, Union Bay and Deep Bay.

C. SPAWNING CONSISTENCY OVER TIME: CONSTANT

If pooled among all localities, there has been a nearly constant annual record of spawnings since 1937 except for the years, 1968-70 and 1973.

D. MAGNITUDE OF SPAWNINGS: VERY LARGE

1. NUMBER OF SPAWN YEARS/50 YEARS = 46/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 46/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 650.0 Km.
4. CUMULATIVE SPAWN AREA = 5184.4 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 15 (74.3)
2. MEAN WEIGHTED DATE (DOY) = March 14 (72.9)

F. COMMENTS:

Section 142, the Lambert Channel region, is the largest herring spawning area on the British Columbia coast and it supports the main seine and gillnet fisheries in Georgia Strait. Therefore it is the most economically valuable herring spawning area. Probably, this area is the center of spawning activity of a stock that spawns from sections 141 to 143 and perhaps beyond. Both sections 142 and 143 have a nearly continuous record of spawnings. There are 479 spawns in section 142 from 1928 to 1986, with only one 3-year gap from 1968 to 1970. The mean time is March 15. Section 143 has a total of 169 spawns from 1929 to 1986 but there are periodic gaps with the longest period of 6 years from 1965 to 1971 with only one spawn in 1968. The mean date is March 15. Section 142 includes the east coast of Denman Island which has some of the largest single spawns on record.

G. ROE FISHERIES:

1. NUMBER OF SEINE FISHERY YEARS/15 YEARS = 4/15 (1972-86)
2. NUMBER OF GILLNET FISHERY YEARS/15 YEARS = 9/15 (1972-86)
3. MEAN SEINE CATCH/YEAR = 2454 tons
4. MEAN GILLNET CATCH/YEAR = 5226 tons (area 14)

Table 142-5. History of roe fishery catches by year type in Baynes Sound.

SECT. 142	SEINE NET ROE FISHERIES				GILLNET ROE FISHERIES			
YEAR	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA
1972	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	-	-	-
1976	-	-	-	-	08/03-17/03	168	(4860)	Comox to NW Bay
1977	-	-	-	-	-	-	-	-
1978	-	-	-	-	06/03-14/03	192	(1699)	Comox to NW Bay
1979	-	-	-	-	07/03-12/03	48	(5500)	Comox to NW Bay
1980	06/03	2.5	-	E. Denman Is.	05/03-06/03	24	(3600)	Comox to French Creek
1981	04/03	7.2	2883	E. Denman Is.	04/03-08/03	95	7024	E. Denman Is.
1982	-	-	-	-	05/03-07/03	39	6000	E. Denman Is.
1983	27/02	6.9	1600	Comox Bar	27/02-01/03	44	8833	E. Denman Is.
1984	-	-	-	-	09/03 & 11/03	36	(8325)	Comox to French Creek
1985	06/03	4.2	2879	E. Denman Is.	08/03 & 09/03	12	3686	E. Denman Is.
1986	-	-	-	-	-	-	-	-

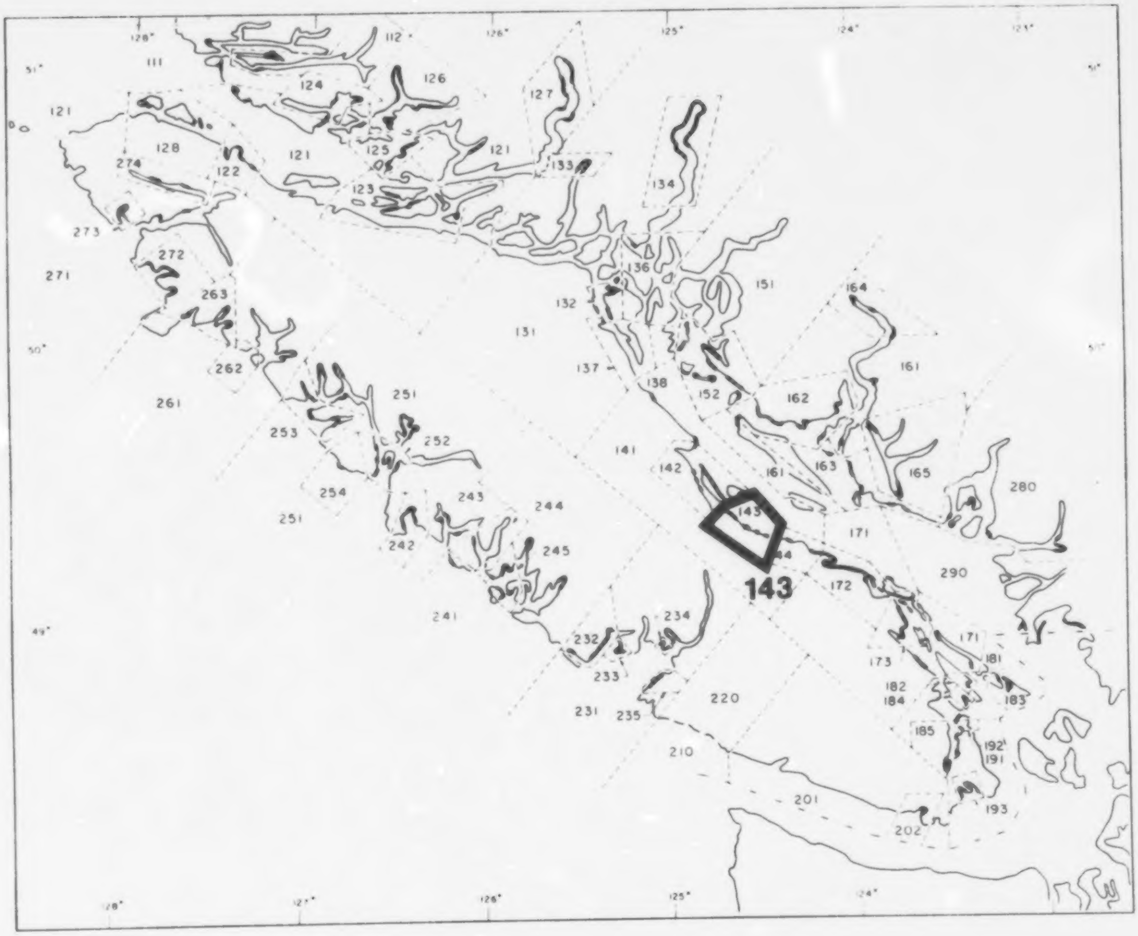

Fig. 143-1. Overview map showing location of section 143, Qualicum.

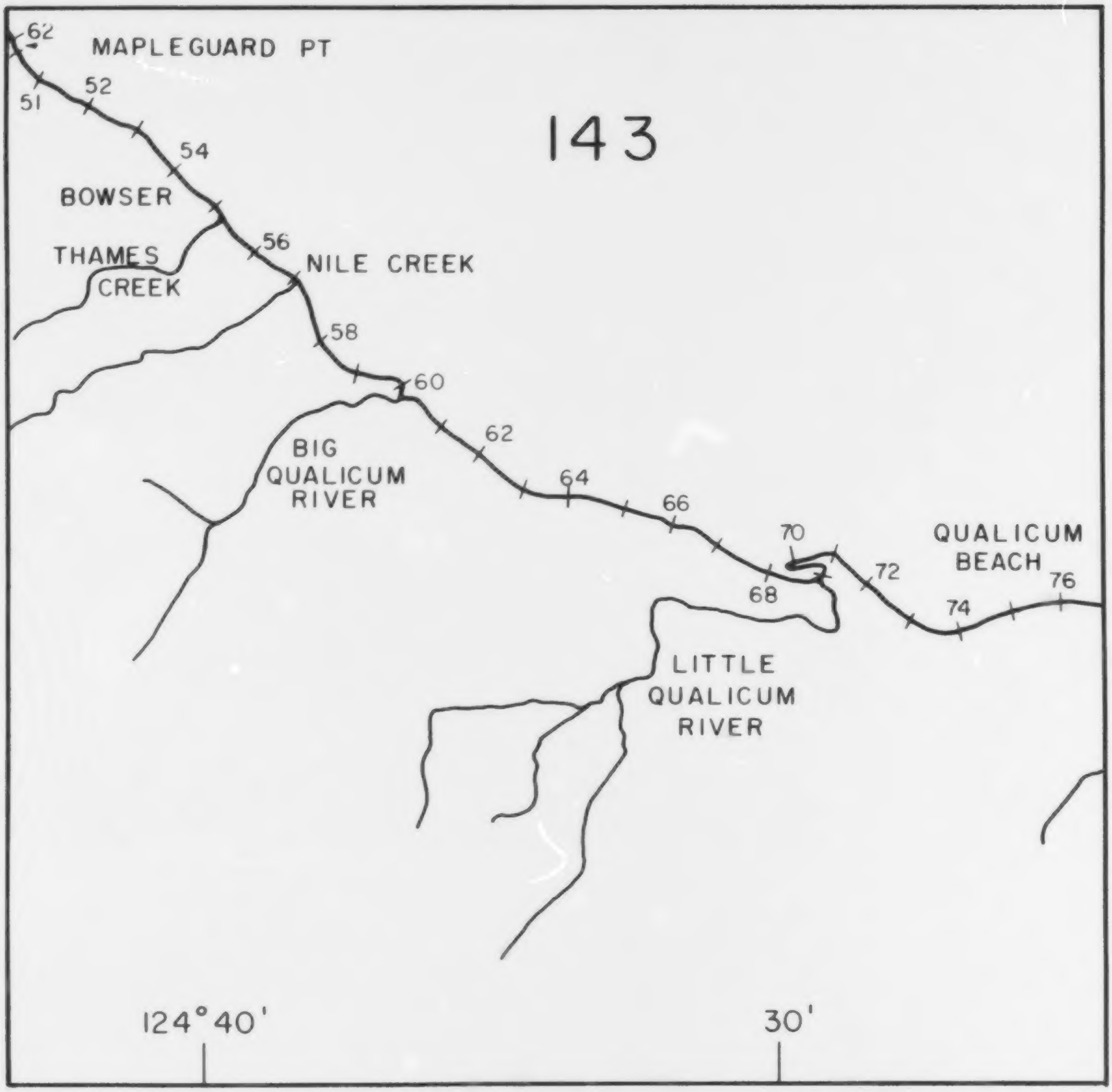

Fig. 143-2. Detailed map of section 143, Qualicum.

Table 143-1. Section 143 - spawn position by year.

```
    49.00     59.00     69.00     79.00
      +----+----+----+----+----+----+--
1937 +        aa
1938 +
1939 + aaaaaaabbaaaccb         aaa
1940 +        bba  bba
1941 +        aaaabccbaaaaa
1942 +                   a     aaa
1943 +
1944 +
1945 +             bb
1946 +
1947 +    aabbbaaa aa   aa
1948 +       aaaa   a
1949 +             aaa
1950 +
1951 +
1952 + 1111111111111111111111    1
1953 +  1111111              11
1954 + 111
1955 +            11             11
1956 +  111111
1957 +    11111     1
1958 +    11        11
1959 +            111111111111
1960 +            1111111
1961 +          1 1    1
1962 +     1      1 1  2
1963 +      11   11122111
1964 +            1
1965 +
1966 +
1967 +
1968 +       11
1969 +
1970 +
1971 +              11333   21
1972 +                 121   1
1973 +               11111           1
1974 +   11111       111111  1
1975 +   111111   11  11
1976 +                1111111    11111
1977 +   1122132133343323321 111111111
1978 +        1211111121111 1111 1111
1979 +   11122111 111        1113
1980 +     ab      aa    a      a
1981 +                           11211
1982 +   11112231$$     aa  1111
1983 +        aa
1984 +     aaa          aaa
1985 +             bb    c      b
1986 +   aaaaaaabbaa  aaaaaaa
      +----+----+----+----+----+----+--
    49.00     59.00     69.00     79.00
            BT N Q  B    L      Q
            OH I U  I    I      U
            WA L A  G    T      A
            SM E L       T      L
            EE   I  Q    L      I
            RS C C  U    E      C
               R U  A           U
             C E M  L    Q      M
             R E    I    U
             E K R  C    A      B
             E   I  U    L      E
             K   V  M    I      A
                 E       C      C
                 R  R    U      H
                         M
```

Table 143-2. Section 143 - histogram of cumulative spawn frequency over distance

```
                        position(km)
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                        48.00 +                                                                               0    0    0    0
                        49.00 +                                                                               0    0    0    0
                        50.00 +**0                                                                            2    1    0    3
                        51.00 +****0                                                                          4    1    0    5
                        52.00 +*********00                                                                    9    2    0   11
                        53.00 +**********0000                                                                10    4    0   14
                        54.00 +************000000                                                            12    6    0   18
BOWSER                  55.00 +************0000000000                                                        12   10    0   22
THAMES CREEK            56.00 +*************00000000000                                                      13   11    0   24
                        57.00 +************0000000000000                                                     12   13    0   25
NILE CREEK              58.00 +*********000000000000                                                          9   12    0   21
                        59.00 +******000000000                                                                6    9    0   15
QUALICUM RIVER          60.00 +*********000000                                                                9    6    0   15
                        61.00 +****************00000                                                         16    5    0   21
                        62.00 +***********0000000000000000                                                   11   16    0   27
BIG QUALICUM RIVER      63.00 +***************0000000000000000                                               15   16    0   31
                        64.00 +*************000000                                                           13    6    0   19
                        65.00 +****************00                                                            16    2    0   18
                        66.00 +******************000                                                         18    3    0   21
                        67.00 +****************000000                                                        16    6    0   22
LITTLE QUALICUM RIVER   68.00 +**********00000000000                                                         10   11    0   21
                        69.00 +*******0000                                                                    7    4    0   11
                        70.00 +****000                                                                        4    3    0    7
                        71.00 +*****00                                                                        5    2    0    7
                        72.00 +********0                                                                      8    1    0    9
                        73.00 +********0                                                                      8    1    0    9
                        74.00 +****000                                                                        4    3    0    7
QUALICUM BEACH          75.00 +****000000                                                                     4    6    0   10
                        76.00 +******000                                                                      6    3    0    9
                        77.00 +*****0                                                                         5    1    0    6
                        78.00 +*****0                                                                         5    1    0    6
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
```

Table 143-2 (cont'd.)

```
position(km)
         +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
         0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
   79.00 +****0                                                                           4    1    0    5
   80.00 +****0                                                                           4    1    0    5
   81.00 +                                                                                0    0    0    0
   82.00 +                                                                                0    0    0    0
         +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
         0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 143-3. Herring statistical spawn summary for section 143.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	29593	548	0	7.0	90.0	0.00	90.0	90	90	1	1
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	6	933839	17293	0	8.7	65.7	2.36	63.7	59	76	5	4
1940	4	260609	4826	0	5.0	63.3	7.36	64.2	46	76	4	2
1941	5	694939	12869	0	5.4	74.8	1.53	74.3	70	78	4	3
1942	2	143157	2651	115	6.0	67.5	5.50	63.5	62	73	2	2
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	2	86834	1608	64	5.0	67.5	0.50	67.5	67	68	2	1
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	4	511335	9469	3	6.0	71.3	6.06	64.5	59	84	4	4
1948	2	157953	2925	23	7.0	65.0	7.00	58.9	58	72	2	2
1949	1	98714	1828	14	7.0	69.0	0.00	69.0	69	69	1	1
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	2	1130295	20931	47	6.0	67.0	0.00	67.0	67	67	1	2
1953	2	345498	6398	64	7.0	70.0	10.00	62.9	60	80	2	2
1954	1	98714	1828	64	6.0	79.0	0.00	79.0	79	79	1	1
1955	2	108542	2010	9	6.0	83.0	0.00	83.0	83	83	1	2
1956	1	264065	4890	78	5.0	81.0	0.00	81.0	81	81	1	1
1957	2	207310	3839	14	5.0	82.5	6.50	77.2	76	89	2	2
1958	2	83918	1554	87	6.0	80.0	5.00	77.9	75	85	2	2
1959	2	518248	9597	46	5.0	62.5	0.50	62.0	62	63	2	2
1960	2	281345	5210	58	5.0	65.0	2.00	64.5	63	67	2	2
1961	3	71551	1325	105	4.7	62.0	1.00	62.4	60	63	2	2
1962	5	76573	1418	28	4.0	67.8	3.01	68.9	56	72	4	3
1963	6	352897	6535	43	5.0	64.3	2.03	63.4	58	70	5	3
1964	1	1458	27	27	5.0	79.0	0.00	79.0	79	79	1	1
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	1	59239	1097	27	6.0	89.0	0.00	89.0	89	89	1	1
1969	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	7	375037	6945	124	5.0	84.3	1.34	85.8	80	91	5	3
1972	4	86402	1600	39	3.8	82.0	2.00	80.6	80	88	2	2
1973	5	104870	1942	25	4.4	77.6	3.39	76.0	68	85	4	3
1974	6	371419	6878	27	4.8	84.8	1.17	82.6	81	88	4	2
1975	4	365263	6764	46	6.0	85.0	3.49	82.6	79	92	3	3
1976	3	452150	8373	45	4.3	77.3	2.85	78.3	74	83	3	2
1977	27	1387016	25685	46	4.3	72.0	0.62	72.5	69	77	6	5
1978	6	937781	17366	77	4.7	75.5	3.11	74.3	72	91	3	3
1979	7	700879	12979	89	4.7	69.9	0.14	69.7	69	70	2	4
1980	5	204934	3795	95	2.2	68.0	0.00	68.0	68	68	1	4
1981	2	197428	3656	50	0.0	71.0	0.00	71.0	71	71	1	1
1982	9	824649	15271	92	0.0	70.0	3.00	70.6	64	82	2	3
1983	3	153903	2850	183	0.0	75.3	1.33	75.8	74	78	2	2
1984	2	202504	3750	175	0.0	67.5	4.50	67.2	63	72	2	2
1985	7	221404	4100	116	0.0	87.1	0.74	86.8	86	90	2	3
1986	3	861316	15950	124	0.0	73.0	0.00	73.0	73	73	1	3
All	159	13963580	258580	66	5.0	73.6	0.69	71.4	46	92	35	8

Table 143-4. Spawn summary for section 143 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section from Bowser to Qualicum Beach.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Bowser and Qualicum.

C. SPAWNING CONSISTENCY OVER TIME: FREQUENT

There have been four main spawning episodes, 1939-42, 1945-49, 1952-64 and 1971-86.

D. MAGNITUDE OF SPAWNINGS: LARGE

1. NUMBER OF SPAWN YEARS/50 YEARS = 39/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 39/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 258.6 Km.
4. CUMULATIVE SPAWN AREA = 1396.4 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 15 (73.6)
2. MEAN WEIGHTED DATE (DOY) = March 12 (71.4)

F. COMMENTS:

Section 143 is a major herring spawn area, but the spawnings are not continuous over time, and they frequently are geographically continuous with spawnings in section 142. Therefore, herring spawning in this area probably are part of a larger stock, centered in section 142. Also see comments on section 142.

G. ROE FISHERIES:

1. NUMBER OF SEINE FISHERY YEARS/15 YEARS = 1/15 (1972-86)
2. NUMBER OF GILLNET FISHERY YEARS/15 YEARS = 6/15 (1972-86)
3. MEAN SEINE CATCH/YEAR = 4272 tons
4. MEAN GILLNET CATCH/YEAR = 5226 tons (area 14)

Table 143-5. History of roe fishery catches by gear type in Qualicum.

SECT. 143	SEINE NET ROE FISHERIES				GILLNET ROE FISHERIES			
YEAR	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA
1972	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	-	-	-
1976	-	-	-	-	08/03-17/03	168	(4860)	Comox to NW Bay
1977	09/03-11/03 & 13/03	52	4272	Mapleguard Pt to French Crk.	07/03-17/03	192	(7570)	Mapleguard Pt to NW Bay
1978	-	-	-	-	06/03-14/03	192	(1699)	Comox to NW Bay
1979	-	-	-	-	07/03-12/03	48	(5500)	Comox to NW Bay
1980	-	-	-	-	05/03-06/03	24	(3600)	Comox to French Creek
1981	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	09/03 & 11/03	36	(8325)	Comox to French Creek
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-

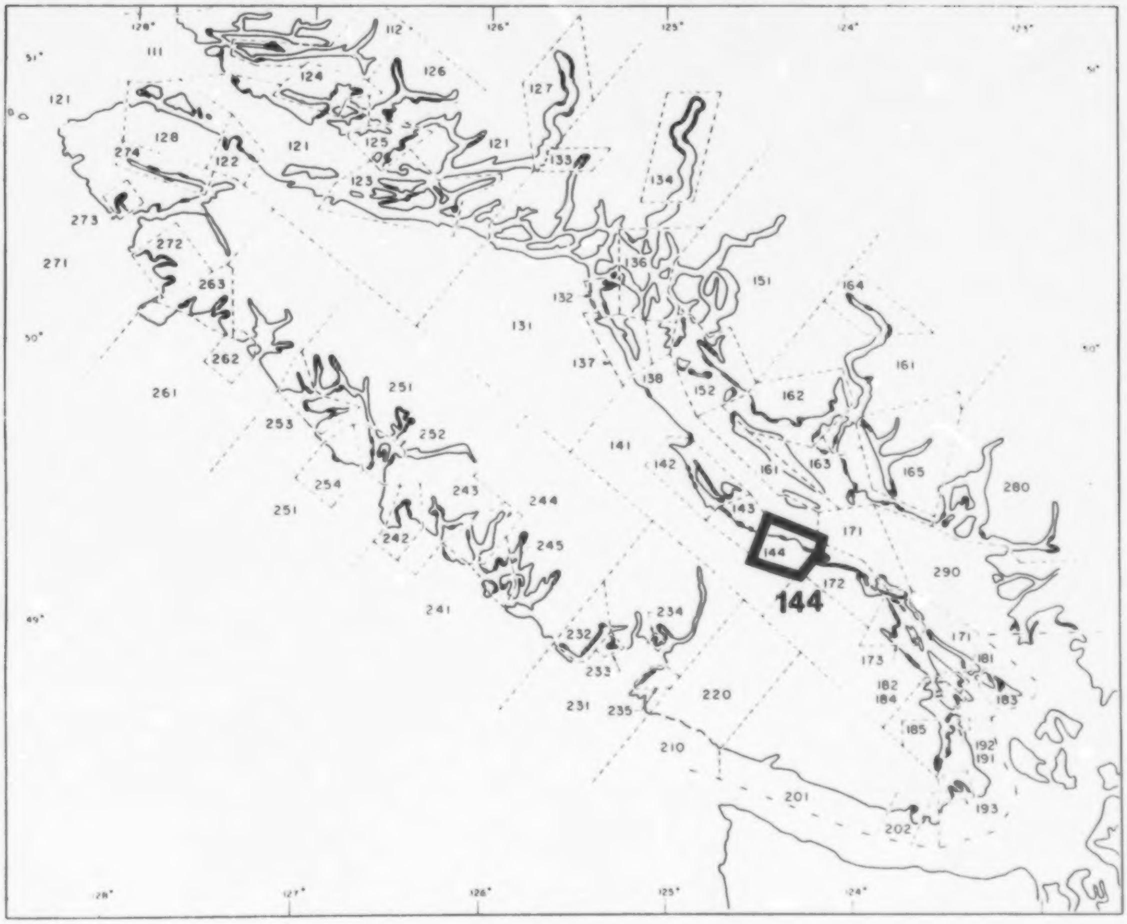

Fig. 144-1. Overview map showing location of section 144, French Creek.

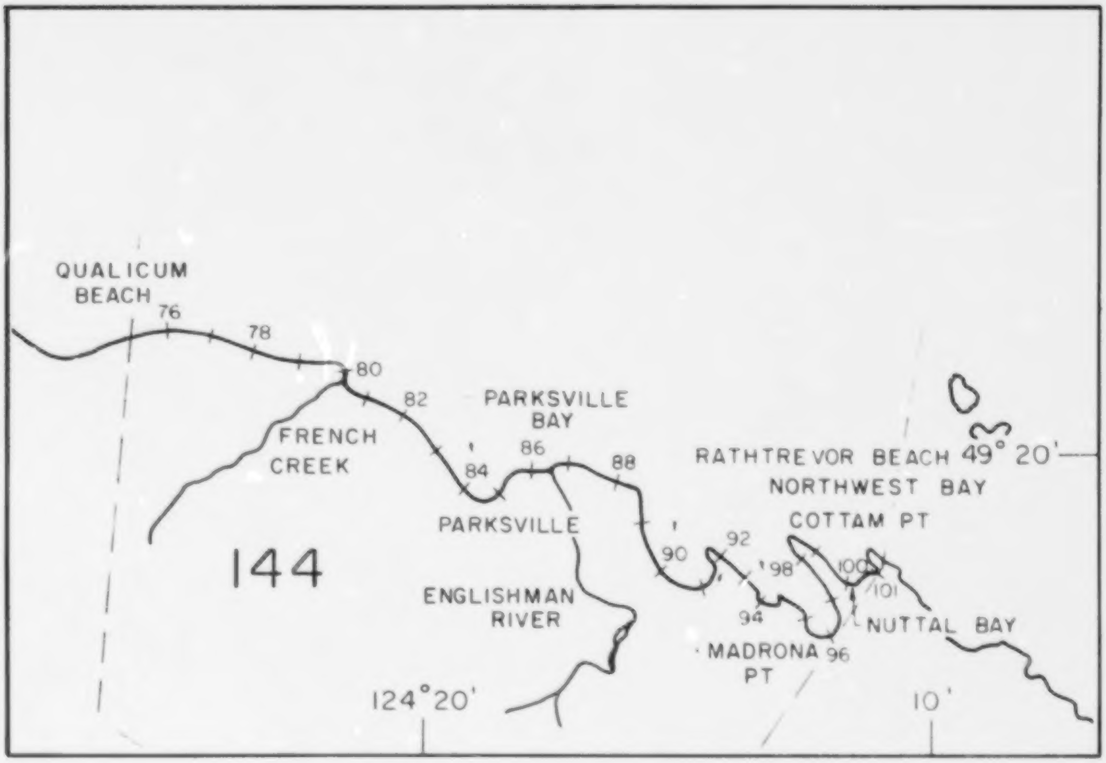

Fig. 144-2. Detailed map of section 144, French Creek.

Table 144-1. Section 144 - spawn position by year.

```
    76.00     86.00     96.00
      +----+----+----+----+----+-
1937 +     aa
1938 +
1939 +         aa
1940 +
1941 +    aaba aa aaa
1942 +      aaabbaa      a    a
1943 +    aaaa
1944 +
1945 +
1946 +
1947 +      a
1948 +
1949 +    aaaaa
1950 +
1951 +
1952 +
1953 +     1111
1954 +     1111
1955 +     322211111   1  1
1956 +     11          1
1957 +         1111
1958 +
1959 +     1
1960 +
1961 +
1962 +                      1
1963 +    12
1964 +
1965 +
1966 +
1967 +
1968 +                        1
1969 +
1970 +
1971 +             1       1 1
1972 +
1973 +
1974 +      1               11211
1975 +      1 1        11    111
1976 +    13223323433  1234222 11
1977 +    1111111 11111    1   11
1978 +    11111           11
1979 +    12111 111        3
1980 +     bb aa&^ 111
1981 +     12112
1982 + 111122$1   11
1983 +     abba              aaa
                ^^^
1984 +
1985 +
1986 +
      +----+----+----+----+----+-
    76.00     86.00     96.00
            FP P ~ RM    N C  N
            RA A E AA    O O  U
            ER R N TD    R T  T
            NK K G HR    T T  T
            CS S L TO    H A  A
            HV V I RN    W M  L
             I I S EA    E
            CL L H V     S P  B
            RL L M OP    T O  A
            EE E A RO      I  Y
            E    N  I    B N
            KB     BN    A T
             A   R ET    Y
             Y   I A
                 V C
                 E H
                 R
```

Table 144-2. Section 144 - histogram of cumulative spawn frequency over distance

```
                    position(km)
                          0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
                          +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                    75.00 +                                                                                0    0    0    0
                    76.00 +                                                                                0    0    0    0
                    77.00 +*                                                                               1    0    0    1
                    78.00 +*                                                                               1    0    0    1
                    79.00 +*0                                                                              1    1    0    2
                    80.00 +******00000                                                                     6    5    0   11
                    81.00 +*******************00000000000                                                 19   11    0   30
FRENCH CREEK        82.00 +****************000000000000000                                                16   15    0   31
PARKSVILLE BAY      83.00 +***********00000000000                                                         11   11    0   22
                    84.00 +*************000000                                                            13    6    0   19
PARKSVILLE          85.00 +********000000                                                                  8    6    0   14
                    86.00 +******000000III                                                                 6    6    3   15
 ENGLISHMAN RIVER   87.00 +******0III                                                                      6    1    3   10
                    88.00 +*********00I                                                                    9    2    1   12
RATHTREVOR BEACH    89.00 +********0                                                                       8    1    0    9
MADRONA POINT       90.00 +*****0                                                                          5    1    0    6
                    91.00 +**                                                                              2    0    0    2
                    92.00 +*                                                                               1    0    0    1
                    93.00 +****                                                                            4    0    0    4
                    94.00 +***                                                                             3    0    0    3
NORTHWEST BAY       95.00 +***0                                                                            3    1    0    4
                    96.00 +******                                                                          6    0    0    6
COTTAM POINT        97.00 +********                                                                        8    0    0    8
                    98.00 +****                                                                            4    0    0    4
                    99.00 +*****0                                                                          5    1    0    6
NUTTAL BAY         100.00 +****00                                                                          4    2    0    6
                   101.00 +****0                                                                           4    1    0    5
                   102.00 +***                                                                             3    0    0    3
                   103.00 +                                                                                0    0    0    0
                          +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                          0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
```

Table 144-3. Herring statistical spawn summary for section 144.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	75526	914	0	7.0	90.0	0.00	90.0	90	90	1	1
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	1	132955	1609	0	7.0	61.0	0.00	61.0	61	61	1	1
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	4	564955	6837	0	5.5	80.0	6.04	80.3	62	88	3	3
1942	5	521160	6307	158	5.0	74.8	3.20	78.8	63	80	4	4
1943	1	265827	3217	64	3.0	63.0	0.00	63.0	63	63	1	1
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	1	33218	402	3	3.0	87.0	0.00	87.0	87	87	1	1
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	1	377628	4570	27	9.0	71.0	0.00	71.0	71	71	1	1
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	1	226577	2742	27	7.0	80.0	0.00	80.0	80	80	1	1
1954	1	226577	2742	55	5.0	87.0	0.00	87.0	87	87	1	1
1955	5	970761	11748	41	6.2	69.2	0.97	70.3	67	72	3	2
1956	2	67924	822	69	5.5	81.0	0.00	81.0	81	81	1	2
1957	1	199391	2413	55	7.0	75.0	0.00	75.0	75	75	1	1
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	1	30243	366	137	1.0	78.0	0.00	78.0	78	78	1	1
1960	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1961	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1962	1	22641	274	27	5.0	94.0	0.00	94.0	94	94	1	1
1963	2	37763	457	21	5.0	64.0	0.00	64.0	64	64	1	1
1964	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	1	30243	366	27	5.0	77.0	0.00	77.0	77	77	1	1
1969	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	3	29830	361	12	5.0	85.7	0.33	86.0	85	86	2	2
1972	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	3	356474	4314	15	4.7	82.0	2.08	83.8	78	85	3	2
1975	4	422911	5118	46	5.5	84.3	1.70	86.0	80	87	3	3
1976	19	2279073	27581	82	5.0	74.1	0.67	73.4	67	80	9	4
1977	5	830782	10054	178	4.8	73.0	0.63	73.4	72	75	3	4
1978	3	366308	4433	70	6.0	70.0	1.00	71.2	69	72	2	3
1979	6	607924	7357	21	4.6	79.3	4.78	70.1	68	90	3	3
1980	5	528845	6400	110	3.0	74.0	4.00	73.4	63	88	3	4
1981	3	362507	4387	116	0.0	71.0	2.00	70.9	69	75	2	2
1982	6	627921	7599	182	0.0	77.0	2.65	76.5	64	81	4	3
1983	3	479266	5800	117	0.0	67.7	5.84	66.5	56	74	3	3
1984	2	223106	2700	100	0.0	84.0	3.00	82.6	81	87	2	1
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	91	10898336	131890	84	5.1	75.9	0.83	74.5	56	94	27	9

Table 144-4. Spawn summary for section 144 from 1937 to 1986.

A. GENERAL:

There are two main spawning areas in this section:
(i) Parksville and
(ii) Northwest Bay

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Parksville, French Creek and Northwest Bay.

C. SPAWNING CONSISTENCY OVER TIME: FREQUENT

There have been three main spawning episodes, 1939-43, 1953-57 and 1974-84 with intermittent spawnings in other years.

D. MAGNITUDE OF SPAWNINGS: LARGE

1. NUMBER OF SPAWN YEARS/50 YEARS = 28/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 28/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 131.9 Km.
4. CUMULATIVE SPAWN AREA = 1089.8 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 17 (75.9)
2. MEAN WEIGHTED DATE (DOY) = March 16 (74.5)

F. COMMENTS:

Section 144 is a major herring spawning area but the records are not continuous and they frequently are geographically continuous with sections to the north (143) and south (172). Probably, herring spawning here are part of the large herring stock centered in section 142. Mean spawning times are nearly identical between sections. Also, see comments for section 142.

G. ROE FISHERIES:

1. NUMBER OF SEINE FISHERY YEARS/15 YEARS = 0/15 (1972-86)
2. NUMBER OF GILLNET FISHERY YEARS/15 YEARS = 6/15 (1972-86)
3. MEAN SEINE CATCH/YEAR = 0 tons
4. MEAN GILLNET CATCH/YEAR = 5226 tons (area 14)

Table 144-5. History of roe fishery catches by gear type in French Creek.

SECT. 144	SEINE NET ROE FISHERIES				GILLNET ROE FISHERIES			
YEAR	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA
1972	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-
1975	-	-	-	-	18/03-27/03	192	285	French Creek to NW Bay
1976	-	-	-	-	08/03-17/03	168	(4860)	Comox to NW Bay
1977	-	-	-	-	07/03-17/03	192	(7570)	Mapleguard Pt. to NW Bay
1978	-	-	-	-	07/03-14/03	168	(1699)	Comox to NW Bay
1979	-	-	-	-	07/03-12/03	48	(5500)	Comox to NW Bay
1980	-	-	-	-	09/03-12/03	82	100	French Creek to NW Bay
1981	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-

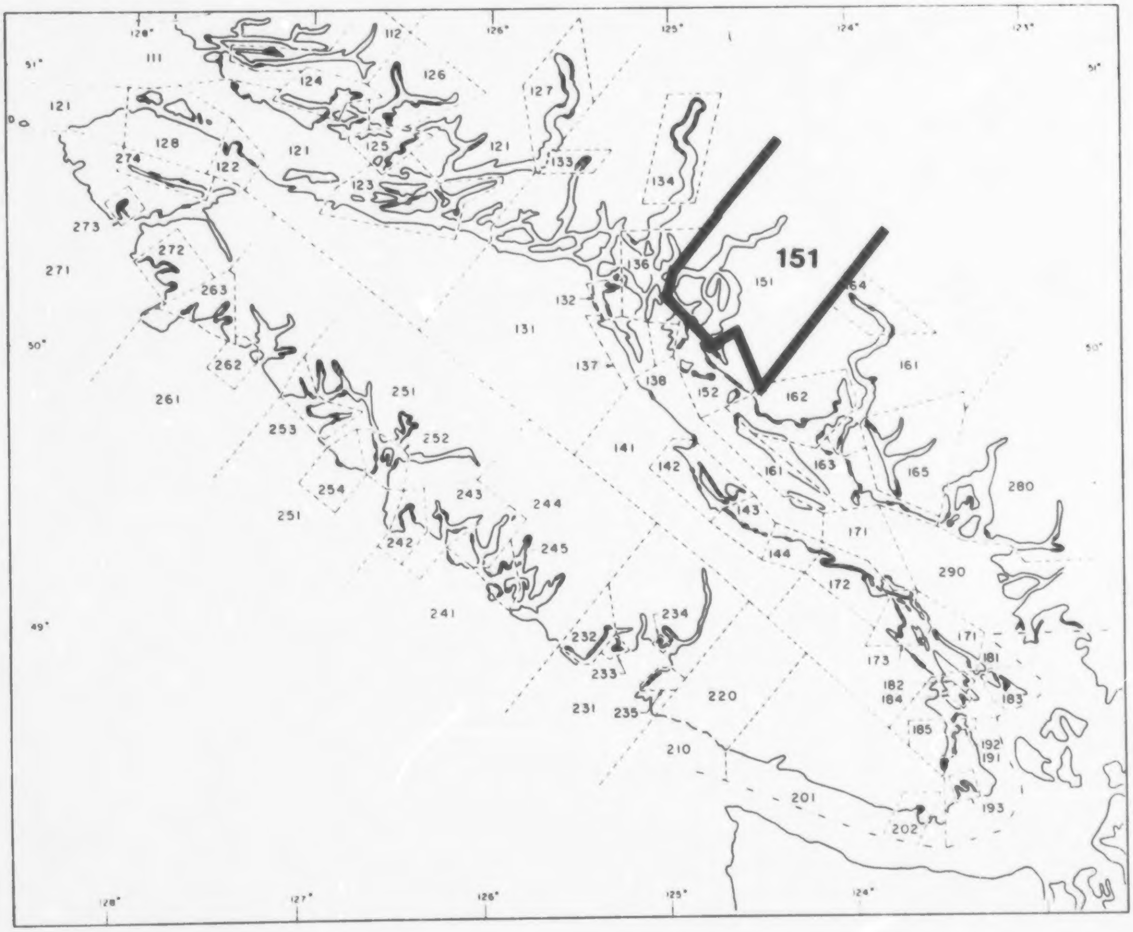

Fig. 151-1. Overview map showing location of section 151, Other Area 15.

Table 151-4. Spawn summary for section 151 from 1937 to 1986.

A. GENERAL:

There is one spawning area in Toba Inlet.

B. COMPLETENESS OF RECORDS:

Probably some spawns were not recorded but there is considerable marine traffic in this area. Therefore, most large spawnings, if they had occurred in this area, would have been recorded.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There are only 6 records of herring spawning in Toba Inlet: in 1930, 1934, 1936 (2 records), 1939, and 1940. Precise locations within Toba Inlet are unknown.

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 2/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 2/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 3.2 Km.
4. CUMULATIVE SPAWN AREA = N/A

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = April 7 (99.0)
2. MEAN WEIGHTED DATE (DOY) = N/A

F. COMMENTS:

Section 151 is not a significant herring spawning area, but it is puzzling that there should be no records since 1940.

G. ROE FISHERIES:

No major roe fisheries are documented.

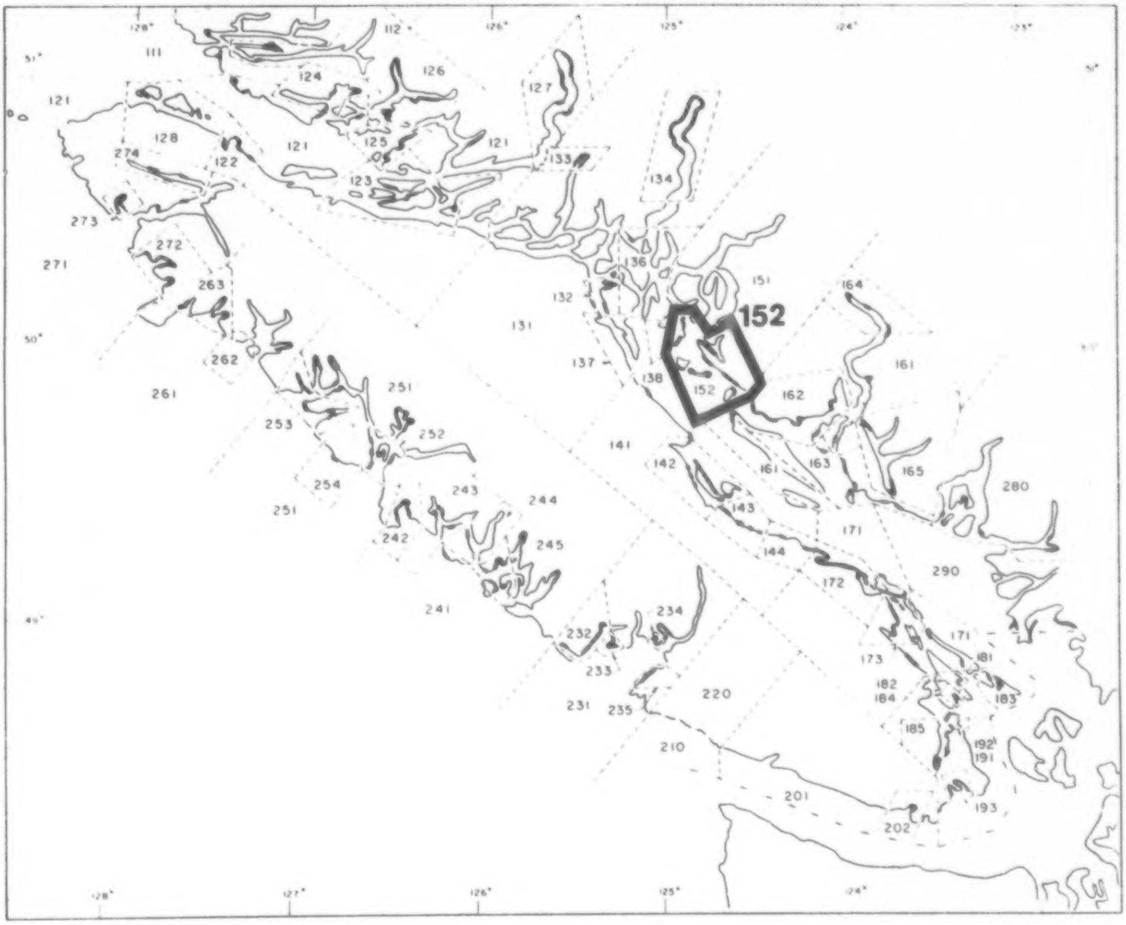

Fig. 152-1. Overview map showing location of section 152, Lund.

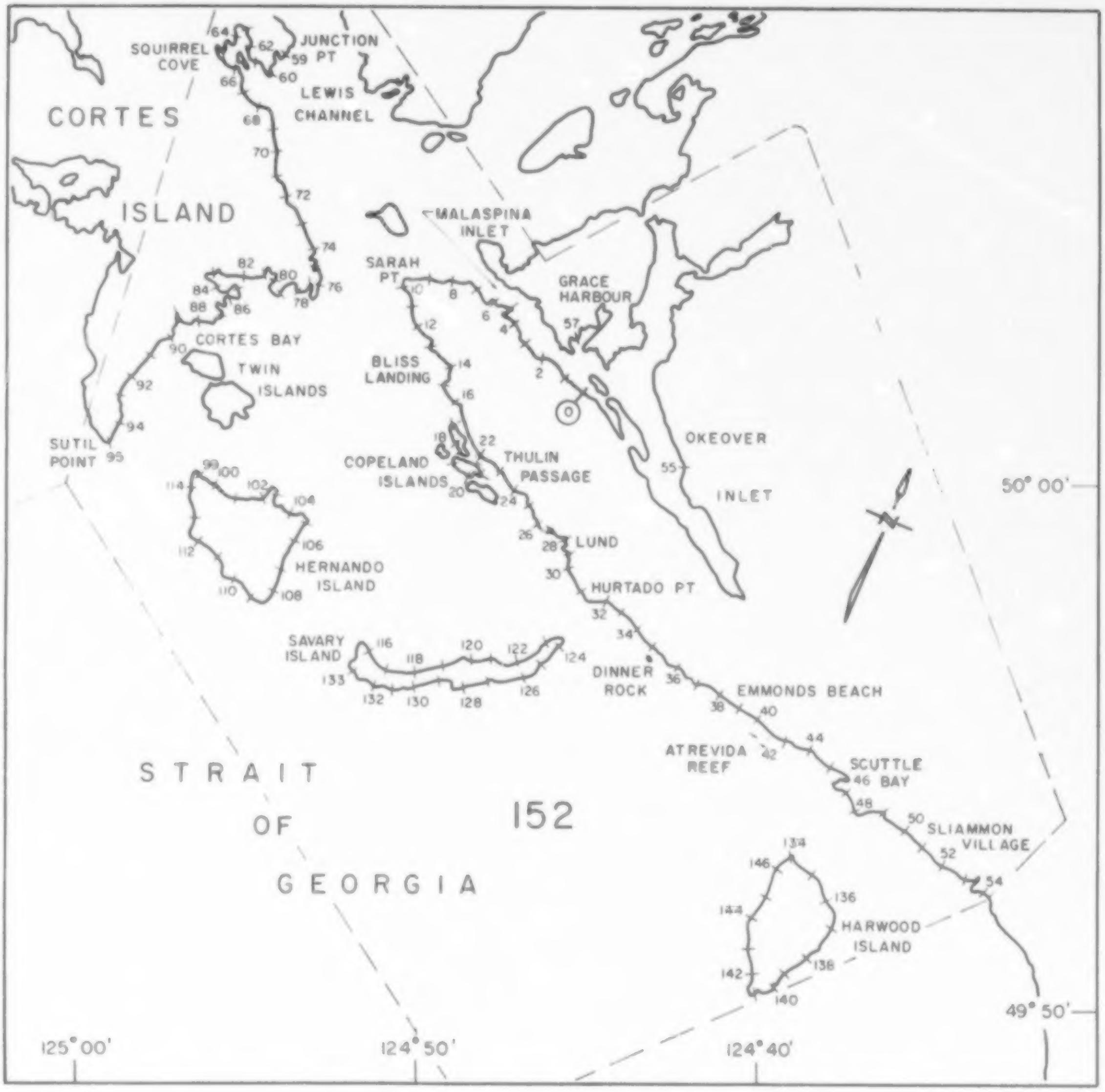

Fig. 152-2. Detailed map of section 152, Lund.

Table 152-1. Section 152 - Spawn position by year.

```
     0.00     10.00     20.00     30.00     40.00     50.00     60.00     70.00     80.00     90.00    100.00
      +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
1937 +                                              a
1938 +                           a                  b                    aa
1939 +                                              a                    aa
1940 +                                              b  b
1941 +                                             aaaaaa
1942 +a                                             a  a
1943 +                                             aaa a
1944 +                                              a  a
1945 +                                              a  a
1946 +                                              a  a
1947 +                                             aaaaa
1948 +                                      aaaaaaa a       ^^           aa             a
1949 +                                              a
1950 +         ^^  ^^    b       d    ^^  c       abcbaa        ^^                              ^^
1951 +                   a       a                  d ab                 aa
1952 +                     aa    a        a         a  a
1953 +                                   aba        b  a
1954 +                                         a   aaa a
1955 +                                             aaa                                  a          a
1956 +
1957 +                                                                            1111            1 12
1958 +
1959 +                                                  1                                   1
1960 +                                        1     b  b                                   11     1
1961 +                                                                                            aaa
1962 +                                         1   11  11                                          $11
1963 +                                                                                           111
1964 +                          11                                                                 a
1965 +                                                                                          1211
1966 +                                                        ^^
1967 +                    11                                       11
1968 +                                                11                                 1       111
1969 +                  $$                         22                    aa
1970 +                  11       1            1       1111         21                            111111111
1971 +1                      1   1            111 1232 1
1972 +                                      11223 1121
1973 +                          11          1111311121 11
1974 +                               11  265   121122
1975 +                          11      111122211  13
1976 +                       1  371       1121 11  12321
1977 +                                  1111111111111
1978 +                            2      12211111  34111
1979 +                          1            1  1231212
1980 +                             1     451   3163231
1981 +                                             231112
1982 +                                     1211 111121121
1983 +                                         c   aba
1984 +
1985 +                                       a e    d
1986 +
      +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
     0.00     10.00     20.00     30.00     40.00     50.00     60.00     70.00     80.00     90.00    100.00
      M         ~   ~    R T     L   ~    D  E A    S  S     ~ ~ ~       S  ~           C        ~ S
      A         S   B    A H     U   H    I  M T    C  L     O G J       Q  L           O        T U
      L         A   L    G U     N   U    N  M R    U  I     K R U       U  E           R        W T
      A         R   I    G L     D   R    N  O E    T  A     E A N       I  W           T        I I
      S         A   S    E I         T    E  N V    T  M     O C C       R  I           E        N L
      P         H   S    D N         A    R  D I    L  M     V E T       R  S           S
      I                              D       S D    E  O     E   I       E                       I P
      N         P   L    ( P         O    R    A       N     R H O       L  C           B        S O
      A         O   A    C A              O  B      B          A N          H           A        L I
                I   N    O S         P    C  E R    A  V     I R         C  A           Y        A N
      I         N   D    P S         O    K  A E    Y  I     N B P       O  N                    N T
      N         T   I    E A         I       C E       L     L O O       V  N                    D
      L             N    L G         N       H F       L     E U I       E  E                    S
      E             G    A E         T                 A     T R N          L
      T                  N                             G         T
                         D                             E
                         )

                         I
                         S
```

```
Table 152-1 (cont'd .  Section 152 - spawn position by year.
      100.00    110.00    120.00    130.00
         +----+----+----+----+----+----+----+----
   1937 +
   1938 +
   1939 +
   1940 +
   1941 +
   1942 +
   1943 +                                     aa
   1944 +                                      a
   1945 +                                      a
   1946 +                                     aa
   1947 +                                     aaa
   1948 +
   1949 +
   1950 +     aa                aa            ab
   1951 +                                      a
   1952 +                                      a
   1953 +                       aa            aa
   1954 +                       aa
   1955 +
   1956 +
   1957 +
   1958 +
   1959 +                     111
   1960 +  1
   1961 +     aa
   1962 +
   1963 +
   1964 +
   1965 +
   1966 +
   1967 +
   1968 +
   1969 +
   1970 +
   1971 +
   1972 +
   1973 +
   1974 +
   1975 +        11
   1976 +                  11   1
   1977 +      11          11   11
   1978 +
   1979 +                     111          111
   1980 +
   1981 +                            131      121
   1982 +                                      22
   1983 +                                     bea
   1984 +                       bba           aaa
   1985 +                       bb            ce
   1986 +                                     aaa
         +----+----+----+----+----+----+----+----
      100.00    110.00    120.00    130.00
              H                  S             H
              E                  A             A
              R                  V             R
              N                  A             W
              A                  R             O
              N                  Y             O
              D                                D
              O                  I
                                 S             I
              I                  L             S
              S                  A             L
              L                  N             A
              A                  D             N
              N                                D
              D
```

Table 152-2. Section 152 - histogram of cumulative spawn frequency over distance

```
                              position(km)
                                     0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                                     +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
MALASPINA INLET                 0.00 +*0                                                                            1    1    0    2
                                1.00 +                                                                              0    0    0    0
                                2.00 +                                                                              0    0    0    0
                                3.00 +                                                                              0    0    0    0
                                4.00 +                                                                              0    0    0    0
                                5.00 +                                                                              0    0    0    0
                                6.00 +                                                                              0    0    0    0
                                7.00 +                                                                              0    0    0    0
                                8.00 +                                                                              0    0    0    0
                                9.00 +III                                                                           0    0    3    3
 SARAH POINT                   10.00 +III                                                                           0    0    3    3
                               11.00 +                                                                              0    0    0    0
                               12.00 +                                                                              0    0    0    0
                               13.00 +II                                                                            0    0    2    2
 BLISS LANDING                 14.00 +II                                                                            0    0    2    2
                               15.00 +                                                                              0    0    0    0
                               16.00 +                                                                              0    0    0    0
                               17.00 +                                                                              0    0    0    0
                               18.00 +**0                                                                           2    1    0    3
RAGGED (COPELAND) ISLAND       19.00 +**0000                                                                        2    4    0    6
                               20.00 +*                                                                             1    0    0    1
THULIN PASSAGE                 21.00 +*0                                                                            1    1    0    2
                               22.00 +0                                                                             0    1    0    1
                               23.00 +**                                                                            2    0    0    2
                               24.00 +                                                                              0    0    0    0
                               25.00 +                                                                              0    0    0    0
                               26.00 +*******                                                                       7    0    0    7
LUND                           27.00 +************0000000                                                          12    7    0   19
                               28.00 +***                                                                           3    0    0    3
                               29.00 +*                                                                             1    0    0    1
                               30.00 +I                                                                             0    0    1    1
 HURTADO POINT                 31.00 +*I                                                                            1    0    1    2
                               32.00 +*                                                                             1    0    0    1
                                     +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                     0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 152-2 (cont'd.)

```
                      position(km)
                             +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                             0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
                      33.00 +                                                                                 0    0    0    0
                      34.00 +**                                                                               2    0    0    2
                      35.00 +*********0                                                                       9    1    0   10
DINNER ROCK           36.00 +****************000000                                                          16    6    0   22
                      37.00 +************0                                                                   12    1    0   13
                      38.00 +**********0                                                                     10    1    0   11
EMMONDS BEACH         39.00 +*********00                                                                      9    2    0   11
                      40.00 +***********0                                                                    11    1    0   12
ATREVIDA REEF         41.00 +*************0000000000                                                         13   10    0   23
                      42.00 +****************0                                                               16    1    0   17
                      43.00 +************0                                                                   12    1    0   13
                      44.00 +************00                                                                  12    2    0   14
                      45.00 +*********************00000000                                                   21    8    0   29
SCUTTLE BAY           46.00 +********************************00000000000000000000000000000000000             32   35    0   67
                      47.00 +************00000000                                                            12    8    0   20
                      48.00 +*********0000                                                                    9    4    0   13
SLIAMMON VILLAGE      49.00 +**********00000000000000000                                                     10   17    0   27
                      50.00 +*******0                                                                         7    1    0    8
                      51.00 +*                                                                                1    0    0    1
                      52.00 +                                                                                 0    0    0    0
                      53.00 +                                                                                 0    0    0    0
                      54.00 +I                                                                                0    0    1    1
OKEOVER INLET         55.00 +I                                                                                0    0    1    1
                      56.00 +I                                                                                0    0    1    1
GRACE HARBOUR         57.00 +I                                                                                0    0    1    1
                      58.00 +I                                                                                0    0    1    1
JUNCTION POINT        59.00 +I                                                                                0    0    1    1
                      60.00 +                                                                                 0    0    0    0
                      61.00 +***                                                                              3    0    0    3
                      62.00 +**                                                                               2    0    0    2
                      63.00 +                                                                                 0    0    0    0
                      64.00 +                                                                                 0    0    0    0
                      65.00 +                                                                                 0    0    0    0
                             +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                             0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
```

Table 152-2 (cont'd.)

```
                            position(km)
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                           66.00 +                                                                                0    0    0    0
SQUIRREL COVE              67.00 +00000                                                                           0    5    0    5
                           68.00 +00000                                                                           0    5    0    5
                           69.00 +                                                                                0    0    0    0
~LEWIS CHANNEL             70.00 +                                                                                0    0    0    0
                           71.00 +                                                                                0    0    0    0
                           72.00 +                                                                                0    0    0    0
                           73.00 +                                                                                0    0    0    0
                           74.00 +                                                                                0    0    0    0
                           75.00 +                                                                                0    0    0    0
                           76.00 +*                                                                               1    0    0    1
                           77.00 +*                                                                               1    0    0    1
                           78.00 +*                                                                               1    0    0    1
                           79.00 +*                                                                               1    0    0    1
                           80.00 +                                                                                0    0    0    0
                           81.00 +                                                                                0    0    0    0
CORTES BAY                 82.00 +00                                                                              0    2    0    2
                           83.00 +*                                                                               1    0    0    1
                           84.00 +                                                                                0    0    0    0
                           85.00 +*                                                                               1    0    0    1
                           86.00 +**                                                                              2    0    0    2
                           87.00 +                                                                                0    0    0    0
                           88.00 +                                                                                0    0    0    0
                           89.00 +                                                                                0    0    0    0
                           90.00 +*I                                                                              1    0    1    2
~TWIN ISLANDS              91.00 +*****I                                                                          5    0    1    6
                           92.00 +******0                                                                         6    1    0    7
SUTIL POINT                93.00 +*****0000                                                                       5    4    0    9
                           94.00 +***0                                                                            3    1    0    4
                           95.00 +****                                                                            4    0    0    4
                           96.00 +*                                                                               1    0    0    1
                           97.00 +*                                                                               1    0    0    1
                           98.00 +*                                                                               1    0    0    1
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 152-2 (cont'd.)

```
                           position(km)
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                            99.00 +*                                                                             1    0    0    1
                           100.00 +                                                                              0    0    0    0
                           101.00 +                                                                              0    0    0    0
                           102.00 +*                                                                             1    0    0    1
                           103.00 +                                                                              0    0    0    0
                           104.00 +                                                                              0    0    0    0
HERNANDO ISLAND            105.00 +00                                                                            0    2    0    2
                           106.00 +*00                                                                           1    2    0    3
                           107.00 +*                                                                             1    0    0    1
                           108.00 +*                                                                             1    0    0    1
                           109.00 +*                                                                             1    0    0    1
                           110.00 +                                                                              0    0    0    0
                           111.00 +                                                                              0    0    0    0
                           112.00 +                                                                              0    0    0    0
                           113.00 +                                                                              0    0    0    0
                           114.00 +                                                                              0    0    0    0
                           115.00 +                                                                              0    0    0    0
                           116.00 +                                                                              0    0    0    0
                           117.00 +                                                                              0    0    0    0
                           118.00 +**                                                                            2    0    0    2
                           119.00 +**                                                                            2    0    0    2
                           120.00 +                                                                              0    0    0    0
                           121.00 +**                                                                            2    0    0    2
                           122.00 +**                                                                            2    0    0    2
                           123.00 +****0000000                                                                   4    7    0   11
SAVARY ISLAND              124.00 +*0000000                                                                      1    7    0    8
                           125.00 +0                                                                             0    1    0    1
                           126.00 +                                                                              0    0    0    0
                           127.00 +                                                                              0    0    0    0
                           128.00 +*                                                                             1    0    0    1
                           129.00 +***                                                                           3    0    0    3
                           130.00 +*                                                                             1    0    0    1
                           131.00 +                                                                              0    0    0    0
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 152-2 (cont'd.)

```
                   position(km)
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                    132.00 +                                                                              0    0    0    0
                    133.00 +                                                                              0    0    0    0
                    134.00 +*                                                                             1    0    0    1
                    135.00 +*                                                                             1    0    0    1
                    136.00 +*                                                                             1    0    0    1
                    137.00 +*000000000000                                                                 1   12    0   13
HARWOOD ISLAND      138.00 +****0000000000000000000000                                                    4   22    0   26
                    139.00 +***0000                                                                       3    4    0    7
                    140.00 +                                                                              0    0    0    0
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 152-3. Herring statistical spawn summary for section 152.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	61902	804	0	7.0	84.0	0.00	84.0	84	84	1	1
1938	4	52894	687	0	4.5	97.8	8.49	93.7	74	110	3	3
1939	2	92854	1206	0	6.0	82.5	8.50	85.3	74	91	2	2
1940	4	84384	1096	0	7.0	90.3	1.38	90.3	87	93	4	2
1941	3	247763	3218	0	5.7	68.0	0.00	68.0	68	68	1	3
1942	3	123112	1599	52	7.0	68.3	0.33	68.2	68	69	2	3
1943	3	183012	2377	76	5.7	72.0	2.00	70.8	68	74	2	3
1944	3	77378	1005	91	7.0	62.7	0.33	62.4	62	63	2	3
1945	3	77378	1005	91	4.3	68.3	0.67	67.7	67	69	2	3
1946	3	133737	1737	91	6.3	75.0	0.00	75.0	75	75	1	3
1947	4	327220	4250	184	8.0	66.3	5.60	61.6	60	83	3	4
1948	5	616483	8007	29	5.8	85.2	7.32	84.6	67	109	5	5
1949	2	122111	1586	48	6.0	74.0	0.00	74.0	74	74	1	2
1950	27	739364	9603	39	5.4	91.7	2.70	82.7	65	107	11	15
1951	10	409911	5324	57	5.1	85.3	4.15	84.5	69	108	8	6
1952	6	260390	3382	62	5.0	101.2	8.67	94.0	69	136	6	6
1953	7	390585	5073	56	4.9	83.1	6.01	79.2	68	112	7	5
1954	4	239294	3108	103	6.0	81.0	7.52	76.6	66	98	4	4
1955	3	133660	1736	11	4.3	87.0	11.15	91.1	66	104	3	3
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	4	383502	4981	71	4.3	94.8	2.75	91.1	87	100	3	2
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	3	179471	2331	8	3.0	83.0	4.00	89.4	79	91	2	3
1960	8	215734	2802	68	3.3	76.0	3.05	75.6	70	95	5	6
1961	2	142514	1851	25	2.5	81.5	0.50	81.0	81	82	2	2
1962	5	263932	3428	44	4.4	70.4	3.31	68.7	63	82	4	4
1963	1	98551	1280	5	1.0	76.0	0.00	76.0	76	76	1	1
1964	2	38727	503	12	5.5	68.5	9.50	76.3	59	78	2	2
1965	2	247763	3218	14	5.0	86.5	2.50	86.5	84	89	2	1
1966	1	3542	46	23	1.0	82.0	0.00	82.0	82	82	1	1
1967	2	56282	731	3	3.5	91.5	5.50	90.1	86	97	2	2
1968	3	168923	2194	38	4.3	59.7	28.39	72.2	3	91	3	3
1969	5	430699	5594	14	5.4	100.0	5.82	99.9	80	113	5	3
1970	8	943010	12248	8	4.0	75.0	3.87	76.5	60	88	5	6
1971	9	647357	8408	13	6.1	85.8	2.01	85.6	79	99	8	6
1972	5	643893	8363	28	5.0	87.8	2.91	88.7	79	96	4	2
1973	8	805732	10465	24	5.0	88.0	1.76	89.7	80	95	5	4
1974	14	612325	7953	52	3.1	85.0	0.00	85.0	85	85	1	4
1975	8	823440	10695	66	6.7	83.5	0.50	83.1	83	87	2	5
1976	19	869020	11287	77	4.4	82.2	0.69	81.1	78	89	4	5
1977	8	788100	10236	125	3.6	74.4	0.18	74.4	74	75	2	5
1978	15	598236	7770	105	4.3	73.1	3.09	70.4	68	110	5	5
1979	9	932385	12110	305	4.8	68.9	4.26	65.9	63	102	3	5
1980	22	713032	9261	39	3.1	70.2	1.34	68.7	65	96	5	4
1981	12	600006	7793	158	0.0	65.9	0.88	66.7	61	70	6	4
1982	10	934156	12133	105	0.0	66.3	1.52	65.2	60	76	6	6
1983	10	454798	5907	62	0.0	73.2	1.49	71.1	70	80	3	3
1984	3	413837	5375	304	0.0	70.7	1.33	70.2	68	72	2	2
1985	17	704486	9150	60	0.0	67.9	0.70	67.6	65	72	3	5
1986	2	200182	2600	410	0.0	78.5	4.50	80.2	74	83	2	2
All	314	18287070	237516	74	4.7	78.9	0.77	77.7	3	136	52	25

Table 152-4. Spawn summary for section 152 from 1937 to 1986.

A. GENERAL:

There is one major spawning area in the Atrevida Reef-Sliammon vicinity with secondary locations at Sutil Point, Hernando, Savary and Harwood Islands.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Lund and Powell River.

C. SPAWNING CONSISTENCY OVER TIME: CONSTANT

If pooled among all localities, there has been a nearly constant annual record of spawnings since 1937 except for the years, 1956 and 1958.

D. MAGNITUDE OF SPAWNINGS: VERY LARGE

1. NUMBER OF SPAWN YEARS/50 YEARS = 48/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 48/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 237.5 Km.
4. CUMULATIVE SPAWN AREA = 1828.7 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 20 (78.9)
2. MEAN WEIGHTED DATE (DOY) = March 19 (77.7)

F. COMMENTS:

Section 152 is an important herring spawning area with a continuous record of 326 spawns and a mean time of March 20. Section 162 has a discontinuous record of 84 spawns with a mean time of March 22. The status of spawns in these areas is not clear. It is possible that they represent distinct stocks or they might be part of a larger group, both the northwest (sections 137 & 138), or the southwest (sections 142 & 143) or the southeast (sections 162 & 163). It is noteworthy that there are no records of herring spawning anywhere in section 151, which is mainly Toba Inlet and Desolation Sound. This is the only major inlet in the B.C. coast that does not have even scattered records of herring spawning.

G. ROE FISHERIES:

1. NUMBER OF SEINE FISHERY YEARS/15 YEARS = 2/15 (1972-86)
2. NUMBER OF GILLNET FISHERY YEARS/15 YEARS = 0/15 (1972-86)
3. MEAN SEINE CATCH/YEAR = 3536 tons
4. MEAN GILLNET CATCH/YEAR = 0 tons

Table 152-5. History of roe fishery catches by gear type in Lund.

SECT. 152	SEINE NET ROE FISHERIES				GILLNET ROE FISHERIES			
YEAR	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA
1972	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	-	-	-
1976	-	-	-	-	-	-	-	-
1977	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	04/03 & 05/03	7.2	3200	Scuttle Bay to Sliammon	-	-	-	-
1984	02/03 & 04/03	6.2	3872	Atrevida Reef to Sliammon	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-

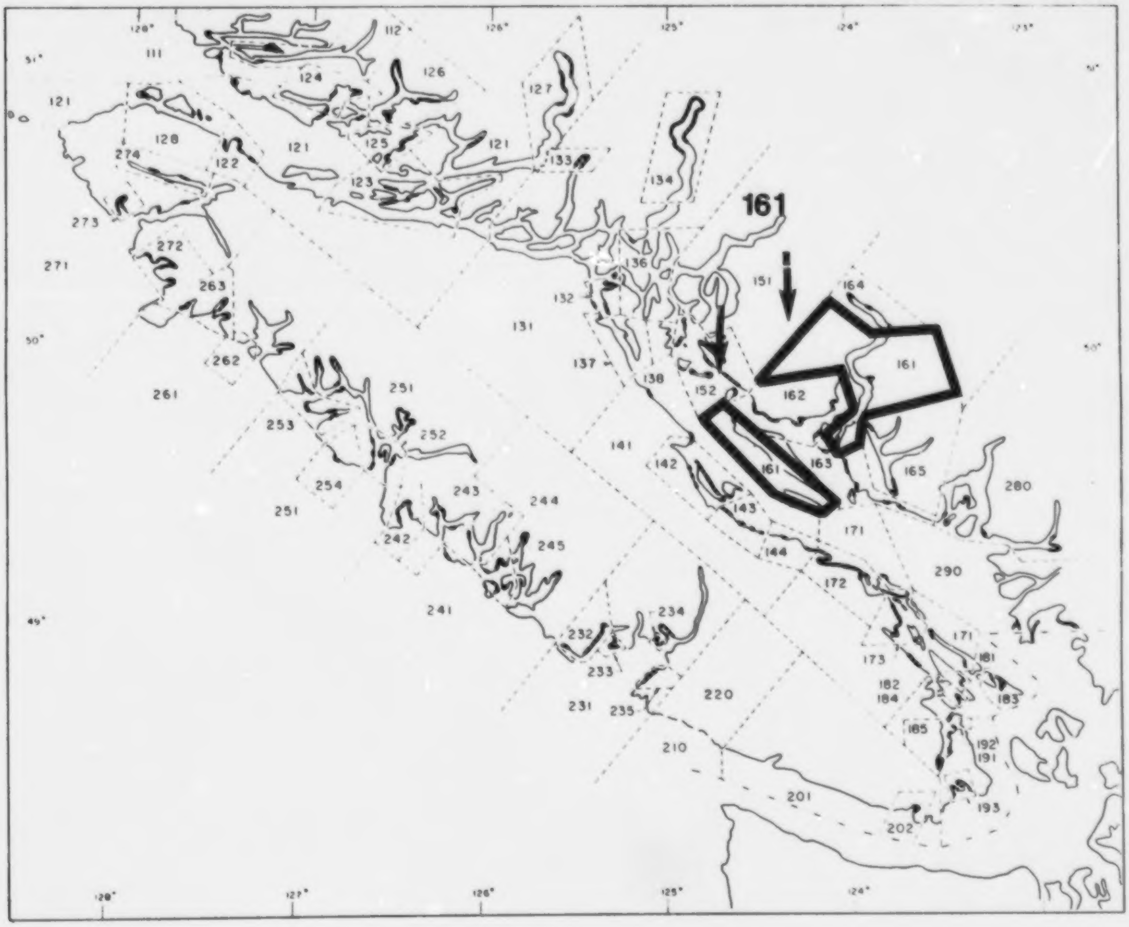

Fig. 161-1. Overview map showing location of section 161, Other Area 16.

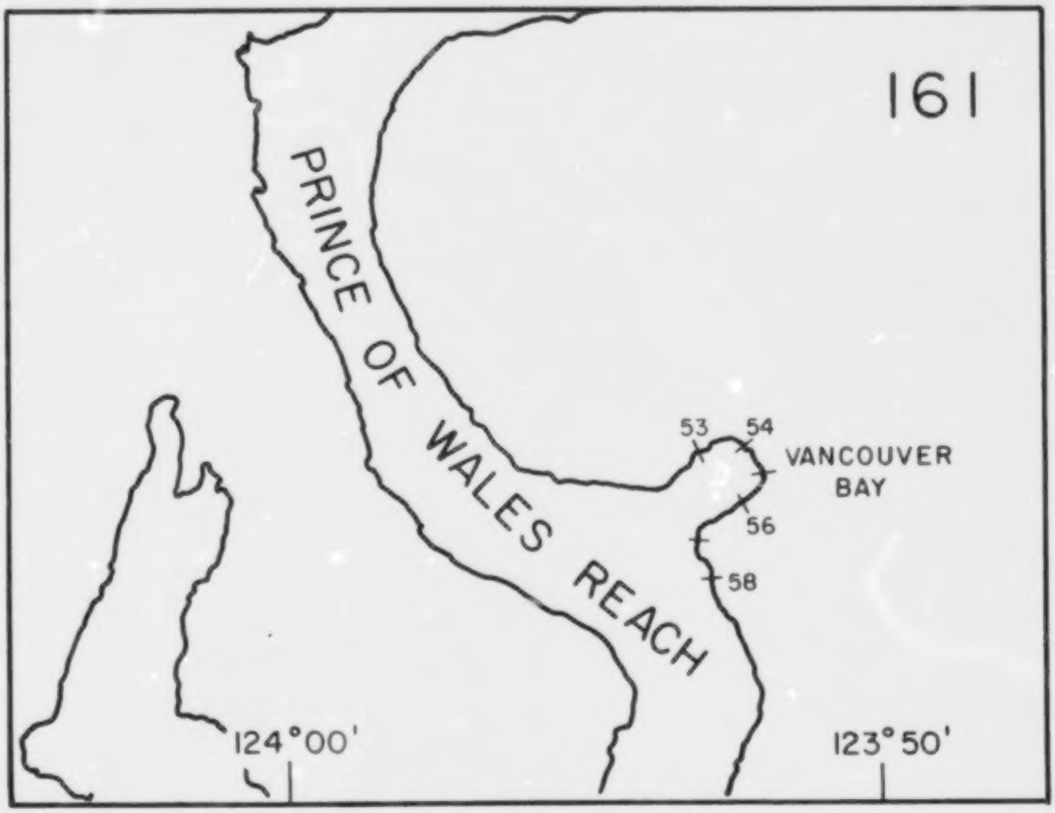

Fig. 161-2. Detailed map of section 161, Other Area 16.

Table 161-1. Section 161 - Spawn position by year.

```
    52.00
      +---
1937 +
1938 +
1939 +
1940 +
1941 +
1942 +
1943 +
1944 +
1945 +
1946 +
1947 +
1948 +
1949 +
1950 +
1951 +
1952 +
1953 +
1954 +
1955 +
1956 +
1957 +
1958 +
1959 + 111
1960 +
1961 +
1962 +
1963 +
1964 +
1965 +
1966 +
1967 +
1968 +
1969 +
1970 +
1971 +
1972 +
1973 +
1974 +
1975 +
1976 +
1977 +
1978 +
1979 +
1980 +
1981 +
1982 +
1983 +
1984 +
1985 +
1986 +
      +---
    52.00
        V
        A
        N
        C
        O
        U
        V
        E
        R

        B
        A
        Y
```

Tahle 161-2. Section 161 - histogram of cumulative spawn frequency over distance

```
                          position(km)
                                 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                          51.00 +                                                                               0    0    0    0
                          52.00 +                                                                               0    0    0    0
VANCOUVER BAY             53.00 +*                                                                              1    0    0    1
                          54.00 +*                                                                              1    0    0    1
                          55.00 +*                                                                              1    0    0    1
                          56.00 +                                                                               0    0    0    0
                          57.00 +                                                                               0    0    0    0
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 161-4. Spawn summary for section 161 from 1937 to 1986.

A. GENERAL:

There is one spawning area in the mid-reaches of Jervis Inlet.

B. COMPLETENESS OF RECORDS:

Some records of small spawnings may be missing but in view of the marine traffic in this area, it is improbable that many major spawnings would have been unreported.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There are only two records of herring spawning in the mid-reaches of Jervis Inlet: Once in 1959 and once in 1955 (not indicated on tables).

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 2/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 2/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 1.4 Km.
4. CUMULATIVE SPAWN AREA = 1.3 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = N/A
2. MEAN WEIGHTED DATE (DOY) = N/A

F. COMMENTS:

Section 161 is not an important spawning area. This section also includes the west coast of Texada Island and no spawnings have ever been reported there.

G. ROE FISHERIES:

No major roe fisheries are documented.

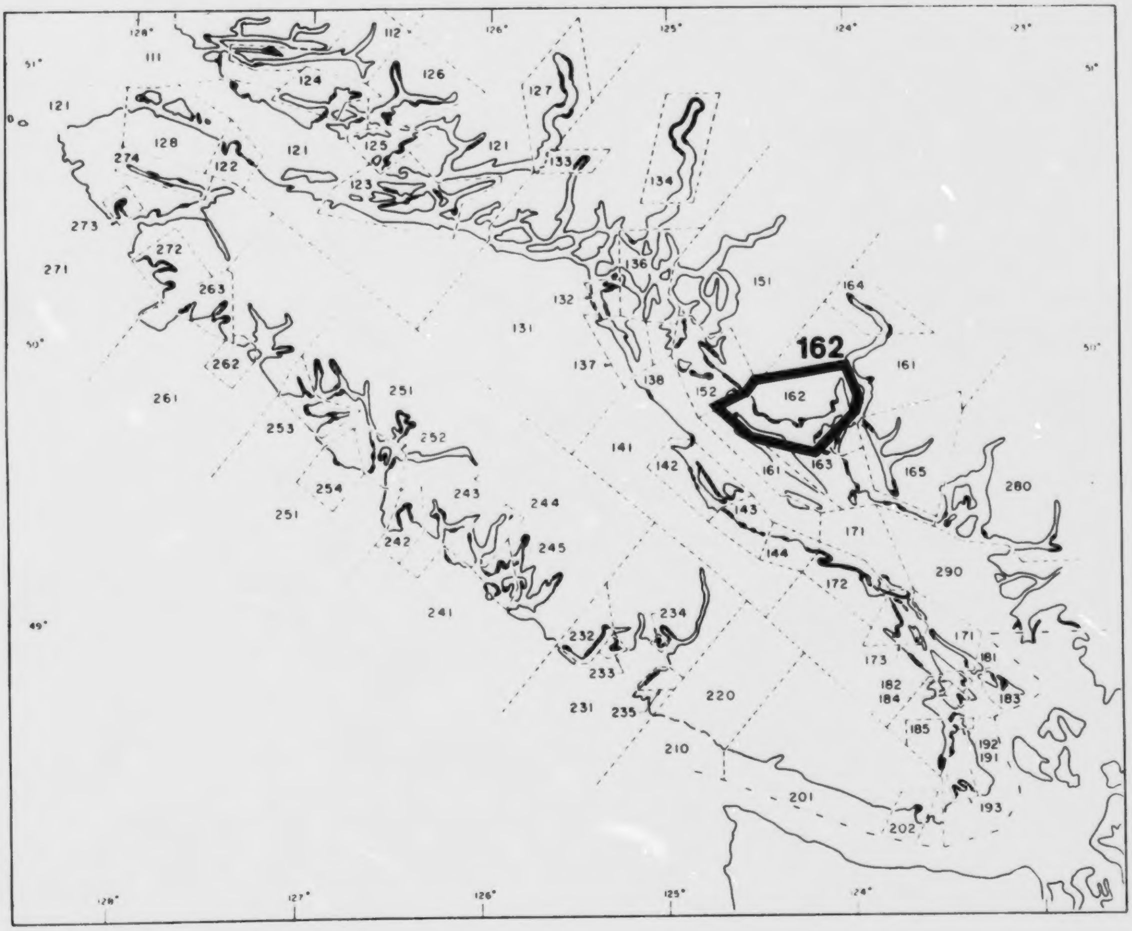

Fig. 162-1. Overview map showing location of section 162, Stillwater.

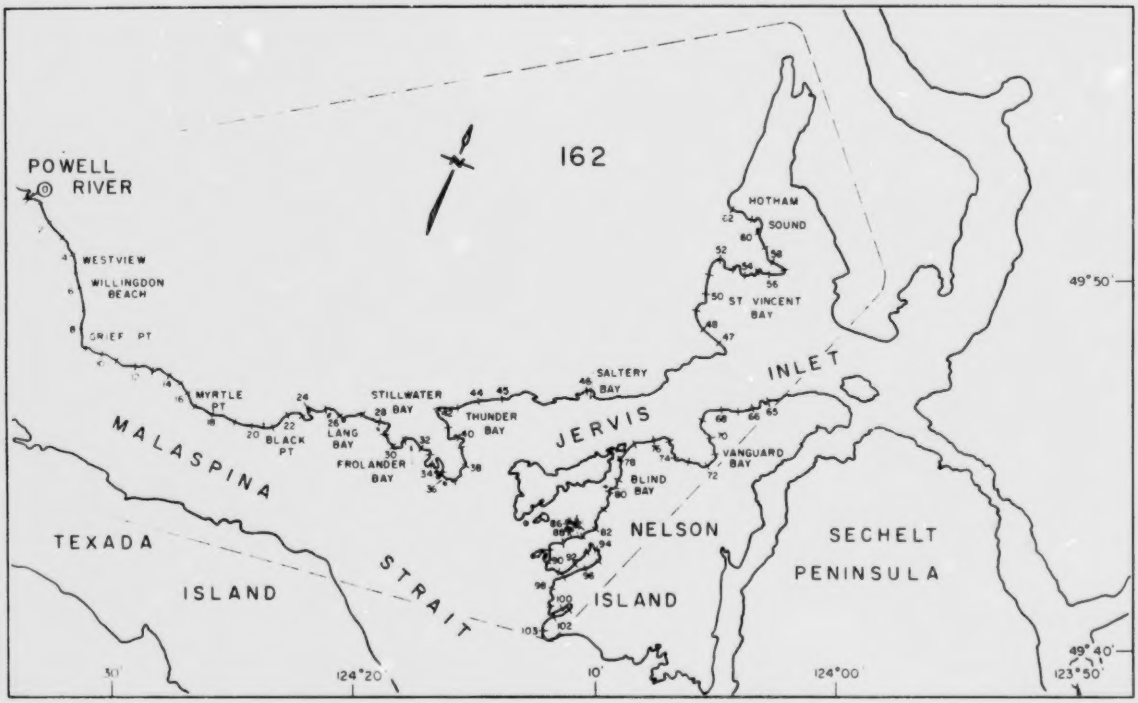

Fig. 162-2. Detailed map of section 162, Stillwater.

Table 162-1. Section 162 - Spawn position by year.

```
      1.00     11.00     21.00     31.00     41.00     51.00     61.00     71.00     81.00
       +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+---
1937 +
1938 +                                        a
1939 +
1940 +                                                                                  a
1941 +                      aaaaa             a
1942 +   aa               ^^  a               a
1943 +
1944 +                                        a
1945 +                                        a
1946 +                                        b
1947 +                                        b
1948 +                                                                                 aa
1949 +                                                                                 aa
1950 +
1951 +                                        a                                        aa
1952 +
1953 +                        a
1954 +
1955 +
1956 +
1957 +
1958 +
1959 +                                       1     1
1960 +                                                                       1     1111111
1961 +                                                                      1        121
1962 +                                                                      1          11
1963 +                                                                               111
1964 +                                                                                 21
1965 +                                                                                 11
1966 +                                                                                 1
1967 +                                                                     1            1
1968 +                                                   1                             11
1969 +  1     1 11           1                                                         1
1970 +           1111111111  1111111                  11                               1
1971 +     1111111      111  11    11                                                  111
1972 +           11$         2$$                                                       211
1973 +            ab          cc
1974 +
1975 +                                       11  ^^^^
1976 +
1977 +
1978 +
1979 + 11111121111111
1980 +
1981 +
1982 +
1983 +
1984 +
1985 +
1986 +

       +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+---
      1.00     11.00     21.00     31.00     41.00     51.00     61.00     71.00     81.00
          W      G  M      ~  LS     F        T     ~  S            ~        V          B
          E      R  Y      B  AT     R        H     S  T            H        A          L
          S      I  R      L  NI     O        U     A  .            O        N          I
          T      E  T      A  GL     L        N     L               T        G          N
          V      F  L      C   L     A        D     T  V            H        U          D
          I         E      K  BW     N        E     E  I            A        A
          E      P            AA     D        R     R  N            M        R          B
          W      O  P      P  YT     E              Y  C                     D          A
                 I  O      O   E     R        B        E            S                   Y
                 N  I      I   R              A     B  N            O        B
                 T  N      N         B        Y     A  T            U        A
                    T      T   B     A              Y               N        Y
                               A     Y                 B            D
                               Y                       A
                                                       Y
```

Table 162-2. Section 162 - histogram of cumulative spawn frequency over distance

```
                          position(km)
                                  0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                            0.00 +                                                                             0    0    0    0
                            1.00 +                                                                             0    0    0    0
                            2.00 +*                                                                            1    0    0    1
                            3.00 +**0                                                                          2    1    0    3
WESTVIEW                    4.00 +*0                                                                           1    1    0    2
                            5.00 +*                                                                            1    0    0    1
                            6.00 +**                                                                           2    0    0    2
                            7.00 +**                                                                           2    0    0    2
                            8.00 +***                                                                          3    0    0    3
                            9.00 +***                                                                          3    0    0    3
                           10.00 +**                                                                           2    0    0    2
GRIEF POINT                11.00 +***                                                                          3    0    0    3
                           12.00 +*****                                                                        5    0    0    5
                           13.00 +***0                                                                         3    1    0    4
MYRTLE POINT (CREEK, ROC   14.00 +***000                                                                       3    3    0    6
                           15.00 +**                                                                           2    0    0    2
                           16.00 +*                                                                            1    0    0    1
                           17.00 +*                                                                            1    0    0    1
                           18.00 +*                                                                            1    0    0    1
                           19.00 +**                                                                           2    0    0    2
                           20.00 +**|                                                                          2    0    1    3
 BLACK POINT (UNSEC 162)   21.00 +**|                                                                          2    0    1    3
                           22.00 +0                                                                            0    1    0    1
                           23.00 +0                                                                            0    1    0    1
LANG BAY                   24.00 +*****000                                                                     5    3    0    8
STILLWATER BAY             25.00 +****00000                                                                    4    5    0    9
                           26.00 +**00000                                                                      2    5    0    7
                           27.00 +*                                                                            1    0    0    1
                           28.00 +*                                                                            1    0    0    1
                           29.00 +*                                                                            1    0    0    1
                           30.00 +**                                                                           2    0    0    2
FROLANDER BAY              31.00 +*                                                                            1    0    0    1
                           32.00 +                                                                             0    0    0    0
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 162-2 (cont'd.)

```
                       position(km)
                            +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                            0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                      33.00 +                                                                              0    0    0    0
                      34.00 +                                                                              0    0    0    0
                      35.00 +                                                                              0    0    0    0
                      36.00 +                                                                              0    0    0    0
                      37.00 +                                                                              0    0    0    0
                      38.00 +                                                                              0    0    0    0
                      39.00 +                                                                              0    0    0    0
THUNDER BAY           40.00 +**0000000000                                                                  2   10    0   12
                      41.00 +*                                                                             1    0    0    1
                      42.00 +                                                                              0    0    0    0
                      43.00 +                                                                              0    0    0    0
                      44.00 +I                                                                             0    0    1    1
                      45.00 +I                                                                             0    0    1    1
SALTERY BAY           46.00 +*I                                                                            1    0    1    2
                      47.00 +I                                                                             0    0    1    1
                      48.00 +                                                                              0    0    0    0
ST. VINCENT BAY       49.00 +*                                                                             1    0    0    1
                      50.00 +*                                                                             1    0    0    1
                      51.00 +                                                                              0    0    0    0
                      52.00 +*                                                                             1    0    0    1
                      53.00 +                                                                              0    0    0    0
                      54.00 +                                                                              0    0    0    0
                      55.00 +                                                                              0    0    0    0
                      56.00 +                                                                              0    0    0    0
                      57.00 +                                                                              0    0    0    0
                      58.00 +                                                                              0    0    0    0
                      59.00 +                                                                              0    0    0    0
                      60.00 +                                                                              0    0    0    0
                      61.00 +                                                                              0    0    0    0
HOTHAM SOUND          62.00 +                                                                              0    0    0    0
                      63.00 +                                                                              0    0    0    0
                      64.00 +                                                                              0    0    0    0
                      65.00 +                                                                              0    0    0    0
                            +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                            0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 162-2 (cont'd.)

```
                      position(km)
                               +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                               0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
                        66.00 +                                                                               0    0    0    0
                        67.00 +                                                                               0    0    0    0
                        68.00 +                                                                               0    0    0    0
                        69.00 +                                                                               0    0    0    0
                        70.00 +*                                                                              1    0    0    1
VANGUARD BAY            71.00 +**                                                                             2    0    0    2
                        72.00 +*                                                                              1    0    0    1
                        73.00 +                                                                               0    0    0    0
                        74.00 +                                                                               0    0    0    0
                        75.00 +                                                                               0    0    0    0
                        76.00 +                                                                               0    0    0    0
                        77.00 +                                                                               0    0    0    0
                        78.00 +*                                                                              1    0    0    1
                        79.00 +*                                                                              1    0    0    1
                        80.00 +***                                                                            3    0    0    3
                        81.00 +****000                                                                        4    3    0    7
BLIND BAY               82.00 +**************0000                                                            14    4    0   18
                        83.00 +********                                                                       8    0    0    8
                        84.00 +***                                                                            3    0    0    3
                        85.00 +**                                                                             2    0    0    2
                        86.00 +*                                                                              1    0    0    1
                        87.00 +                                                                               0    0    0    0
                               +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                               0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
```

Table 162-3. Herring statistical spawn summary for section 162.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	1	2021	91	0	3.0	108.0	0.00	108.0	108	108	1	1
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	1	4064	183	0	5.0	89.0	0.00	89.0	89	89	1	1
1941	2	75497	3400	0	6.0	68.0	0.00	69.4	68	68	1	2
1942	4	60908	2743	81	5.5	74.8	5.79	70.5	68	92	3	4
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	1	2021	91	46	5.0	79.0	0.00	79.0	79	79	1	1
1945	1	2021	91	46	5.0	74.0	0.00	74.0	74	74	1	1
1946	2	4041	182	46	6.0	72.0	0.00	72.0	72	72	1	1
1947	2	4041	182	46	6.0	65.0	2.00	65.0	63	67	2	1
1948	1	20295	914	18	7.0	96.0	0.00	96.0	96	96	1	1
1949	1	16942	763	27	7.0	74.0	0.00	74.0	74	74	1	1
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	2	15521	699	41	3.0	90.0	0.00	90.0	90	90	1	2
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	1	10148	457	23	5.0	98.0	0.00	98.0	98	98	1	1
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	2	8127	366	9	3.0	93.5	0.50	93.6	93	94	2	2
1960	5	95393	4296	7	3.8	67.4	0.68	67.2	66	70	3	2
1961	3	60886	2742	6	4.7	71.0	5.13	71.0	61	78	3	2
1962	2	34507	1554	7	6.0	92.5	11.50	90.5	81	104	2	2
1963	1	40591	1828	3	3.0	65.0	0.00	65.0	65	65	1	1
1964	2	12168	548	3	3.0	66.5	1.50	67.5	65	68	2	1
1965	1	32464	1462	2	3.0	65.0	0.00	65.0	65	65	1	1
1966	1	2021	91	2	6.0	94.0	0.00	94.0	94	94	1	1
1967	2	10148	457	3	3.5	77.0	9.00	75.2	68	86	2	2
1968	2	28422	1280	2	4.5	83.0	11.00	78.3	72	94	2	2
1969	7	107561	4844	16	5.0	109.4	3.66	111.9	89	120	5	6
1970	4	377907	17019	12	5.5	69.8	3.82	67.9	64	81	3	4
1971	7	267903	12065	7	5.0	77.7	2.30	77.0	74	91	5	5
1972	10	179128	8067	13	4.2	84.3	4.98	82.4	55	106	9	5
1973	5	74076	3336	20	5.4	79.2	7.77	85.6	62	101	4	2
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	2	75097	3382	32	2.5	81.0	0.00	81.0	81	81	1	2
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	3	284135	12796	3	4.0	73.0	2.52	74.7	70	78	3	2
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	78	1908054	85929	18	4.7	81.1	1.74	76.9	55	120	40	13

Table 162-4. Spawn summary for section 162 from 1937 to 1986.

A. GENERAL:

There are three main spawning areas at the mouth of Jervis Inlet centered at:

(i) Blind Bay
(ii) Thunder Bay and
(iii) Myrtle Pt

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Powell River.

C. SPAWNING CONSISTENCY OVER TIME: FREQUENT

There have been two main spawning episodes, 1940-49 and 1959-73 with intermittent spawnings in other years.

D. MAGNITUDE OF SPAWNINGS: SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 29/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 29/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 85.9 Km.
4. CUMULATIVE SPAWN AREA = 190.8 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 22 (81.1)
2. MEAN WEIGHTED DATE (DOY) = March 18 (76.9)

F. COMMENTS:

Section 162 has a discontinuous record of 84 spawns with a mean time of March 22. The status of spawns in this area is not clear. It is unlikely that they represent distinct stocks. They may be part of a larger stock group, both the northwest (sections 152, 137 & 138), or the southwest (sections 142 & 143), or the southeast (section 163).

G. ROE FISHERIES:

1. NUMBER OF SEINE FISHERY YEARS/15 YEARS = 1/15 (1972-86)
2. NUMBER OF GILLNET FISHERY YEARS/15 YEARS = 0/15 (1972-86)
3. MEAN SEINE CATCH/YEAR = N/A
4. MEAN GILLNET CATCH/YEAR = 0 tons

Table 162-5. History of roe fishery catches by gear type in Stillwater.

SECT. 162	SEINE NET ROE FISHERIES				GILLNET ROE FISHERIES			
YEAR	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA
1972	11/03- 15/04	840	(4165)	Grief Pt. & sect. 132	-	-	-	-
1973	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	-	-	-
1976	-	-	-	-	-	-	-	-
1977	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-

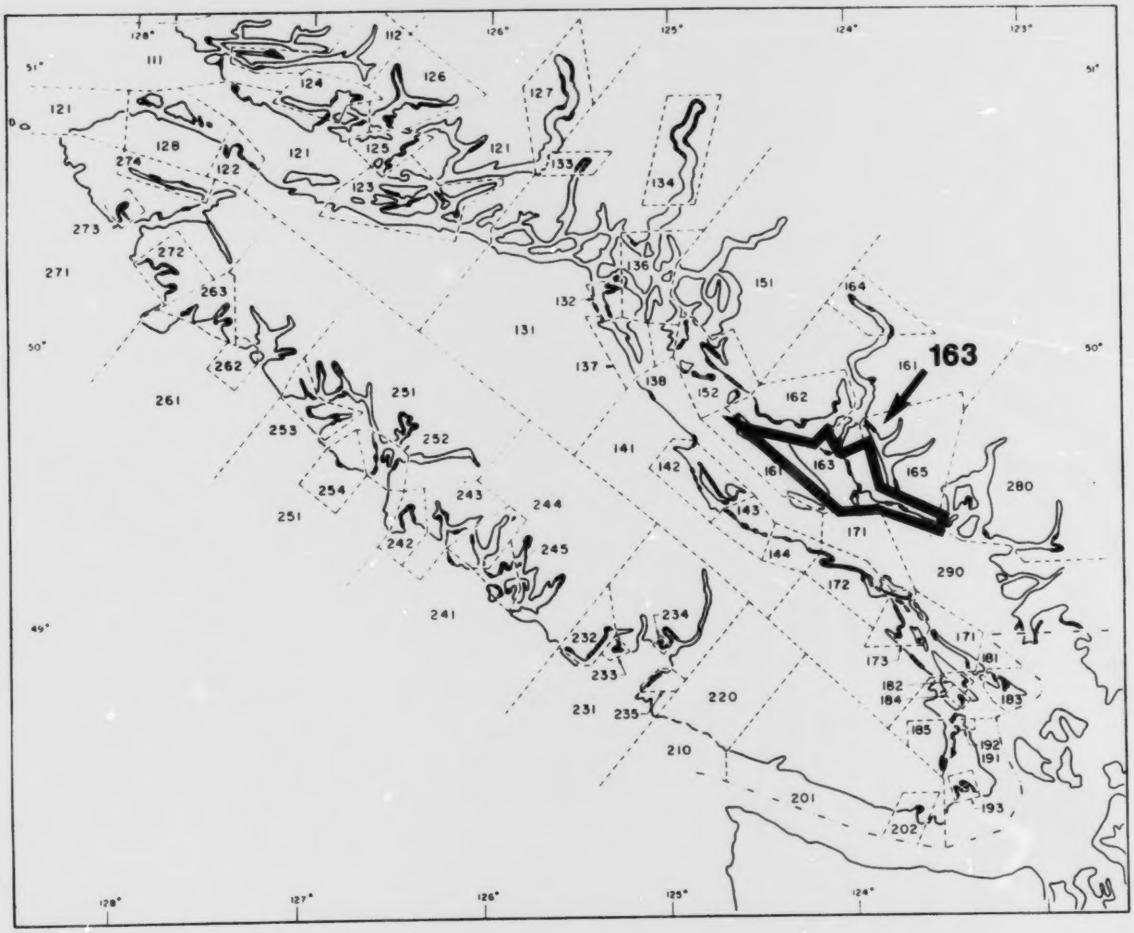

Fig. 163-1. Overview map showing location of section 163, Pender Harbour.

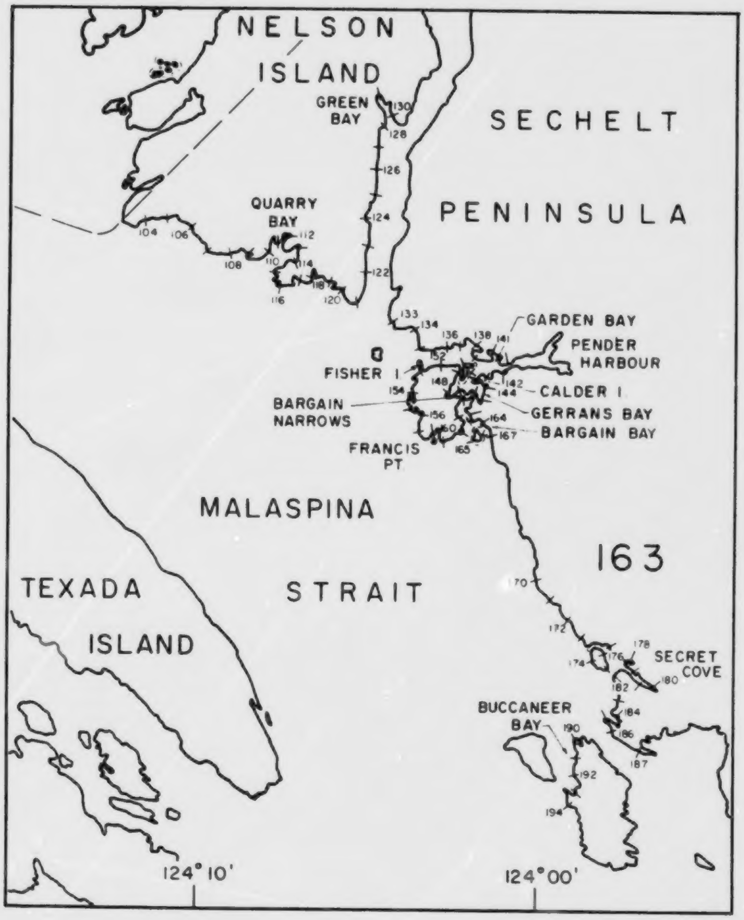

Fig. 163-2. Detailed map of section 163, Pender Harbour.

```
Table 163-1.  Spawn position by year.
  110.00    120.00    130.00    140.00    150.00    160.00    170.00    180.00
     +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+---
1937 +                                 a               aa
1938 +                                 cc                              a
1939 +                                 ca              ab              aa
1940 +                                                 bb              aa
1941 +                                 a               bb              aa
1942 +                                 ca              ab
1943 +                                 aa              aa              a
1944 +                                 a                a
1945 +                                 a                a
1946 +                                 aa              aa
1947 +                                 aa              aa
1948 +                                 a               ab
1949 +                                 a               ab
1950 +                                                  a
1951 +                                 c               bb
1952 +                                       aa        aa
1953 +                                 a      a     a
1954 +                                        a     b  bb
1955 +                                        a     b   a
1956 +                                    1
1957 +                                 21   1
1958 +                                    1122           12
1959 +                            11 11   1   aa          1 1
1960 +                                abb 1         b    11
1961 +                                 11 1 1       1  11111
1962 + 1 11                               1 1  11        11
1963 +                                          1       $1111           121    11
1964 +                         11                    1   11111            111
1965 +                                      aaa        $$a
1966 +                                    11           1222 11
1967 +   1                             1  1 11  1       1111             11
1968 +                                       1          111
1969 +    1                          112 1211   1      1212               1
1970 +  1                      111 111              a  11                11
1971 + 11 1                    1111 11 1   1 1          1
1972 + 11                        1 11  3    12 1
1973 +                                 1    21          131
1974 +                                1                 1
1975 +                                1$1
1976 +                                        a     1
1977 +                   1         1        1        11
1978 +
1979 +
1980 +
1981 +
1982 +
1983 +
1984 +
1985 +
1986 +
     +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+---
  110.00    120.00    130.00    140.00    150.00    160.00    170.00    180.00
        Q                G      F  G   P     CG     B   B              S
        U                R      I  A   E     AE     A   A              E
        A                E      S  R   N     LR     R   R              C
        R                E      H  D   D     DR     G   G              R
        R                N      E  E   E     EA     A   A              E
        Y                       R  N   R     RN     I   I              T
                         B                    S     N   N
        B                A      I  B   H     I                         C
        A                Y      S  A   A     SB     N   B              O
        Y                       L  Y   R     LA     A   A              V
                                A      B     AY     R   Y              E
                                N      O     N      R
                                D      U     D
                                       R
```

Table 163-2. Section 163 - histogram of cumulative spawn frequency over distance

```
                   position(km)
                           0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                    109.00 +                                                                              0    0    0    0
                    110.00 +                                                                              0    0    0    0
                    111.00 +***                                                                           3    0    0    3
QUARRY BAY          112.00 +***                                                                           3    0    0    3
                    113.00 +**                                                                            2    0    0    2
                    114.00 +***                                                                           3    0    0    3
                    115.00 +                                                                              0    0    0    0
                    116.00 +                                                                              0    0    0    0
                    117.00 +                                                                              0    0    0    0
                    118.00 +                                                                              0    0    0    0
                    119.00 +                                                                              0    0    0    0
                    120.00 +                                                                              0    0    0    0
                    121.00 +                                                                              0    0    0    0
                    122.00 +                                                                              0    0    0    0
                    123.00 +                                                                              0    0    0    0
                    124.00 +                                                                              0    0    0    0
                    125.00 +                                                                              0    0    0    0
                    126.00 +                                                                              0    0    0    0
                    127.00 +                                                                              0    0    0    0
                    128.00 +                                                                              0    0    0    0
GREEN BAY           129.00 +*                                                                             1    0    0    1
                    130.00 +                                                                              0    0    0    0
                    131.00 +                                                                              0    0    0    0
                    132.00 +                                                                              0    0    0    0
                    133.00 +                                                                              0    0    0    0
                    134.00 +                                                                              0    0    0    0
                    135.00 +***                                                                           3    0    0    3
FISHER ISLAND       136.00 +***                                                                           3    0    0    3
                    137.00 +***                                                                           3    0    0    3
                    138.00 +**                                                                            2    0    0    2
GARDEN BAY          139.00 +****                                                                          4    0    0    4
                    140.00 +***                                                                           3    0    0    3
                    141.00 +****                                                                          4    0    0    4
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 163-2 (cont'd.)

```
                          position(km)
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                          142.00 +****O                                                                          4    1    0    5
PENDER HARBOUR            143.00 +************OOOOOOOOOOOOOOOOOOOOOOOOO                                         12   25    0   37
                          144.00 +***OOOOOOOOOO                                                                  3   10    0   13
                          145.00 +*                                                                              1    0    0    1
                          146.00 +**********                                                                    10    0    0   10
                          147.00 +****                                                                           4    0    0    4
                          148.00 +***********O                                                                  11    1    0   12
CALDER ISLAND             149.00 +********OO                                                                     8    2    0   10
GERRANS BAY               150.00 +OOOOOOO                                                                        0    7    0    7
                          151.00 +**O                                                                            2    1    0    3
                          152.00 +****                                                                           4    0    0    4
                          153.00 +                                                                               0    0    0    0
                          154.00 +                                                                               0    0    0    0
                          155.00 +                                                                               0    0    0    0
BARGAIN NARR/FRANCIS POIN 156.00 +**OOOOOOOO                                                                     2    8    0   10
                          157.00 +**                                                                             2    0    0    2
                          158.00 +*                                                                              1    0    0    1
                          159.00 +*****OOOOOOOOOOOOOOOOOO                                                        5   18    0   23
BARGAIN BAY               160.00 +*************OOOOOOOOOOOOOOOOOOOOOOOOOOO                                      13   27    0   40
                          161.00 +**************O                                                               14    1    0   15
                          162.00 +***************                                                               15    0    0   15
                          163.00 +****                                                                           4    0    0    4
                          164.00 +****                                                                           4    0    0    4
                          165.00 +**                                                                             2    0    0    2
                          166.00 +                                                                               0    0    0    0
                          167.00 +                                                                               0    0    0    0
                          168.00 +                                                                               0    0    0    0
                          169.00 +                                                                               0    0    0    0
                          170.00 +                                                                               0    0    0    0
                          171.00 +                                                                               0    0    0    0
                          172.00 +                                                                               0    0    0    0
                          173.00 +                                                                               0    0    0    0
                          174.00 +                                                                               0    0    0    0
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 163-2 (cont'd.)

```
                         position(km)
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
SECRET COVE               175.00 +00000                                                                          0    5    0    5
                          176.00 +*000                                                                           1    3    0    4
                          177.00 +****                                                                           4    0    0    4
                          178.00 +*****                                                                          5    0    0    5
                          179.00 +*                                                                              1    0    0    1
                          180.00 +*                                                                              1    0    0    1
                          181.00 +                                                                               0    0    0    0
                          182.00 +                                                                               0    0    0    0
                          183.00 +*                                                                              1    0    0    1
                          184.00 +*                                                                              1    0    0    1
                          185.00 +*                                                                              1    0    0    1
                          186.00 +                                                                               0    0    0    0
                          187.00 +                                                                               0    0    0    0
                          188.00 +                                                                               0    0    0    0
                          189.00 +                                                                               0    0    0    0
                          190.00 +I                                                                              0    0    1    1
 BUCCANEER BAY            191.00 +I                                                                              0    0    1    1
                          192.00 +                                                                               0    0    0    0
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 163-3. Herring statistical spawn summary for section 163.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	2	6642	493	0	5.0	93.5	11.50	86.2	82	105	2	2
1938	4	18713	1389	0	5.0	98.0	5.76	96.1	85	110	4	2
1939	6	24735	1836	0	3.7	91.5	10.10	85.4	58	127	6	3
1940	3	54184	4022	0	6.3	73.7	1.76	73.0	71	77	3	2
1941	4	34960	2595	0	7.0	70.8	0.48	70.9	70	72	3	3
1942	5	15385	1142	33	3.8	77.6	4.70	72.1	68	91	4	2
1943	3	16005	1188	46	3.0	62.3	4.33	64.0	58	71	2	3
1944	2	3691	274	91	6.0	98.0	0.00	98.0	98	98	1	2
1945	2	3691	274	91	3.0	93.0	0.00	93.0	93	93	1	2
1946	2	13539	1005	46	8.0	94.0	0.00	94.0	94	94	1	2
1947	2	14765	1096	46	7.0	69.0	0.00	69.0	69	69	1	2
1948	3	8002	594	40	5.0	68.0	7.00	77.2	61	82	2	2
1949	3	5052	375	21	3.0	67.3	5.33	73.7	62	78	2	2
1950	2	4190	311	16	7.0	85.5	10.50	93.5	75	96	2	2
1951	5	12610	936	18	3.8	87.8	9.71	101.6	68	116	5	2
1952	3	11087	823	17	5.3	65.7	4.18	65.0	61	74	3	3
1953	3	6588	489	16	3.3	95.7	5.36	92.2	85	102	3	3
1954	5	20316	1508	13	4.0	95.6	7.82	92.0	77	117	4	3
1955	4	7706	572	17	4.0	82.8	8.04	79.9	72	106	3	3
1956	1	1051	78	2	1.0	62.0	0.00	62.0	62	62	1	1
1957	4	3395	252	19	4.8	99.0	0.58	98.9	98	100	2	2
1958	5	45199	3355	3	2.6	80.0	1.55	80.7	77	85	4	3
1959	6	30784	2285	10	3.0	79.7	6.58	76.8	66	108	4	3
1960	6	52649	3908	8	4.5	59.5	3.21	66.1	53	70	4	2
1961	7	55276	4103	15	5.0	73.6	4.44	72.6	51	86	4	3
1962	9	47731	3543	5	5.2	76.8	3.06	75.0	65	98	6	4
1963	6	108234	8034	10	5.8	57.8	8.24	64.2	17	68	4	3
1964	5	78205	5805	8	5.0	69.4	0.75	69.7	67	71	3	3
1965	4	45562	3382	6	6.3	75.5	3.77	78.5	69	83	3	3
1966	8	46788	3473	14	4.6	79.6	1.74	80.9	68	83	3	2
1967	7	67091	4980	3	4.4	74.6	3.61	72.1	64	88	7	6
1968	4	25853	1919	3	5.5	81.3	6.86	80.6	67	93	3	2
1969	15	81910	6080	8	5.0	81.3	3.04	82.8	64	109	8	6
1970	7	64019	4752	3	4.7	61.7	3.41	66.8	45	70	6	6
1971	13	60934	4523	14	3.4	69.3	3.80	69.6	51	104	10	7
1972	10	49873	3702	8	3.9	84.5	5.38	87.3	67	114	9	4
1973	7	36011	2673	4	3.6	83.9	6.86	88.1	48	105	6	3
1974	2	2465	183	5	3.0	79.0	2.00	80.0	77	81	2	2
1975	3	16624	1234	5	4.0	78.7	1.76	80.7	76	82	3	2
1976	2	2209	164	3	4.5	82.0	11.00	89.4	71	93	2	2
1977	5	11074	822	7	3.2	74.6	3.20	75.5	62	79	4	4
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	2	4311	320	41	5.0	79.0	0.00	79.0	79	79	1	1
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	201	1219108	90492	14	4.5	78.0	1.08	75.8	17	127	57	15

Table 163-4. Spawn summary for section 163 from 1937 to 1986.

A. GENERAL:

There are three main spawning areas in this Malaspina Strait section:

(i) Pender Harbour
(ii) Bargain Bay and
(iii) Secret Cove

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Pender Harbour. There is an unexplained decline in spawning records in the late 1970's and 1980's.

C. SPAWNING CONSISTENCY OVER TIME: CONSTANT (until 1980)

If pooled among all localities, there has been a constant annual record of spawnings from 1937 to 1977 with only one spawning since 1977 in 1980.

D. MAGNITUDE OF SPAWNINGS: SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 42/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 42/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 90.5 Km.
4. CUMULATIVE SPAWN AREA = 121.9 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 19 (78.0)
2. MEAN WEIGHTED DATE (DOY) = March 17 (75.8)

F. COMMENTS:

This section could represent a small local stock that spawned mainly in the vicinity of Pender Harbour. There are 216 records with a mean time of March 19. The records are continuous from 1936 to 1977 but there has been only one small spawn since (in 1980). Therefore the status of stocks spawning in this area is uncertain.

G. ROE FISHERIES:

No major roe fisheries are documented.

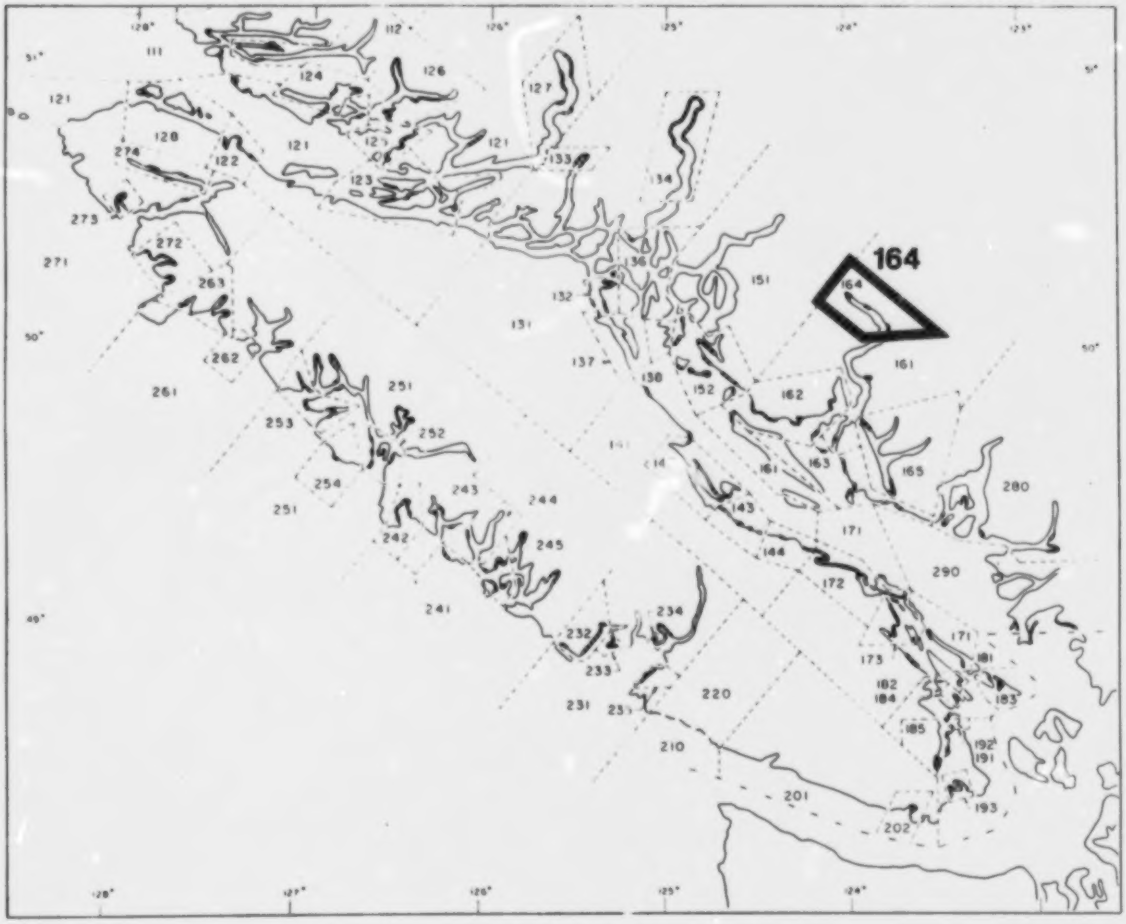

Fig. 164-1. Overview map showing location of section 164, Queens Reach.

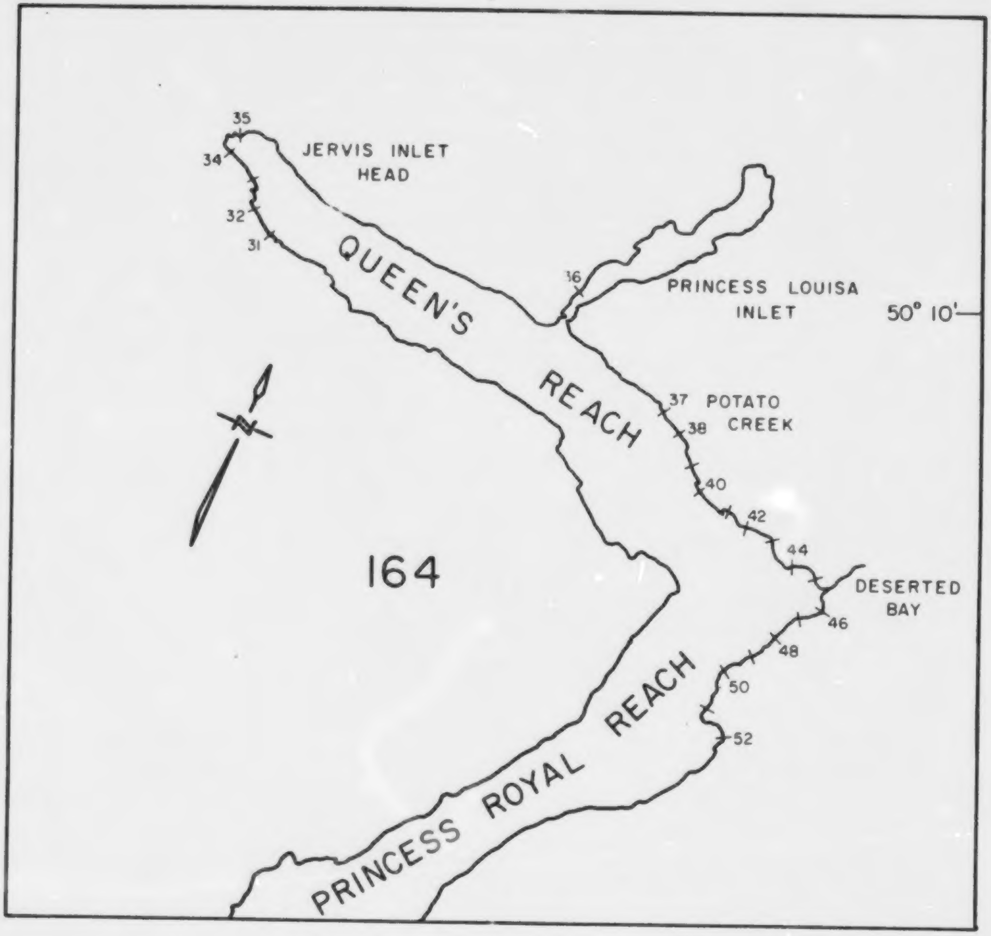

Fig. 164-2. Detailed map of section 164, Queens Reach.

Table 164-1. Section 163 - Spawn position by year.

```
    31.00     41.00     51.00
      +----+----+----+----+
1937 +              a
1938 +              a
1939 +             aaaa
1940 +    ^^       aaaa
1941 +             aaaa
1942 +              aa
1943 +              a
1944 +              a
1945 +              a
1946 +              a
1947 +
1948 +
1949 +              b
1950 +
1951 +
1952 +
1953 +
1954 +
1955 +
1956 +
1957 +
1958 +       111 11     1132
1959 +          11       1
1960 +            111
1961 +      1111  111111
1962 +            11211
1963 +       1111     111
1964 +              11
1965 +            111221
1966 +       1111 111 11
1967 +      1111  111111
1968 +               1
1969 +               111
1970 +             111
1971 +
1972 +              11
1973 +
1974 +                11
1975 +              11111
1976 + 1     1      122211
1977 +               3
1978 +               1
1979 +
1980 +
1981 +
1982 +
1983 +
1984 +
1985 +
1986 +

      +----+----+----+----+
    31.00     41.00     51.00
       J   ~   P    D
       E   P   O    E
       R   R   T    S
       V   I   A    E
       I   N   T    R
       S   C   O    T
           E        E
       I   S   C    D
       N   S   R
       L       E    B
       E   L   E    A
       T   O   K    Y
           U
           .
```

Table 164-2. Section 164 - histogram of cumulative spawn frequency over distance

```
                     position(km)
                              0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                        30.00 +                                                                                 0    0    0    0
                        31.00 +                                                                                 0    0    0    0
JERVIS INLET HEAD       32.00 +*                                                                                1    0    0    1
                        33.00 +                                                                                 0    0    0    0
                        34.00 +                                                                                 0    0    0    0
                        35.00 +I                                                                                0    0    1    1
 PRINCESS LOUISA INLET  36.00 +I                                                                                0    0    1    1
                        37.00 +**                                                                               2    0    0    2
                        38.00 +******                                                                           6    0    0    6
                        39.00 +*****                                                                            5    0    0    5
POTATO CREEK            40.00 +*****                                                                            5    0    0    5
                        41.00 +***                                                                              3    0    0    3
                        42.00 +**                                                                               2    0    0    2
                        43.00 +*******                                                                          7    0    0    7
                        44.00 +*******000                                                                       7    3    0   10
DESERTED BAY            45.00 +************000000000000                                                        12   12    0   24
                        46.00 +*****************0000                                                           17    4    0   21
                        47.00 +************000                                                                 12    3    0   15
                        48.00 +**********                                                                      10    0    0   10
                        49.00 +****                                                                             4    0    0    4
                        50.00 +***                                                                              3    0    0    3
                        51.00 +***                                                                              3    0    0    3
                        52.00 +**                                                                               2    0    0    2
                        53.00 +                                                                                 0    0    0    0
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 164-3. Herring statistical spawn summary for section 164.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	4325	402	0	3.0	105.0	0.00	105.0	105	105	1	1
1938	1	1969	183	0	5.0	108.0	0.00	108.0	108	108	1	1
1939	1	34608	3217	0	5.0	100.0	0.00	100.0	100	100	1	1
1940	2	36577	3400	0	6.0	83.5	3.50	80.4	80	87	2	2
1941	1	34608	3217	0	5.0	81.0	0.00	81.0	81	81	1	1
1942	1	8854	823	23	7.0	74.0	0.00	74.0	74	74	1	1
1943	1	4916	457	23	5.0	88.0	0.00	88.0	88	88	1	1
1944	1	1969	183	91	7.0	105.0	0.00	105.0	105	105	1	1
1945	1	1969	183	91	3.0	104.0	0.00	104.0	104	104	1	1
1946	1	3937	366	91	5.0	108.0	0.00	108.0	108	108	1	1
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	2	3486	324	19	3.0	111.5	3.50	113.9	108	115	2	1
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	7	46399	4313	2	1.0	95.0	0.00	95.0	95	95	1	1
1959	2	4432	412	7	1.0	105.0	0.00	105.0	105	105	1	1
1960	1	25561	2376	5	6.0	83.0	0.00	83.0	83	83	1	1
1961	2	88495	8226	5	6.0	92.0	0.00	92.0	92	92	1	1
1962	2	34415	3199	4	6.0	100.0	0.00	100.0	100	100	1	1
1963	2	45625	4241	4	6.0	78.0	9.00	79.2	69	87	2	2
1964	1	7864	731	2	3.0	87.0	0.00	87.0	87	87	1	1
1965	2	68830	6398	3	6.0	70.0	2.00	70.6	68	72	2	1
1966	3	68830	6398	3	5.0	95.0	0.00	95.0	95	95	1	1
1967	2	78663	7312	2	4.0	94.0	0.00	94.0	94	94	1	1
1968	1	5895	548	2	3.0	102.0	0.00	102.0	102	102	1	1
1969	1	19666	1828	5	7.0	84.0	0.00	84.0	84	84	1	1
1970	2	19666	1828	3	5.0	81.0	0.00	81.0	81	81	1	1
1971	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1972	1	9833	914	3	4.0	107.0	0.00	107.0	107	107	1	1
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	1	14749	1371	3	3.0	112.0	0.00	112.0	112	112	1	1
1975	1	39331	3656	9	1.0	87.0	0.00	87.0	87	87	1	1
1976	5	72767	6764	8	2.6	96.0	0.00	96.0	96	96	1	2
1977	3	8370	778	16	1.7	83.7	6.89	86.2	74	97	3	1
1978	1	3937	366	1	3.0	73.0	0.00	73.0	73	73	1	1
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	53	800546	74414	12	3.8	92.8	1.55	89.7	68	115	24	4

Table 164-4. Spawn summary for section 164 from 1937 to 1986.

A. GENERAL:

There is one main spawning area at the head of Jervis Inlet centered in the Deserted Bay vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Princess Louisa Inlet.

C. SPAWNING CONSISTENCY OVER TIME: FREQUENT

There have been two main spawning episodes, 1937-46 and 1958-78.

D. MAGNITUDE OF SPAWNINGS: SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 30/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 30/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 74.4 Km.
4. CUMULATIVE SPAWN AREA = 80.1 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = April 3 (92.8)
2. MEAN WEIGHTED DATE (DOY) = March 31 (89.7)

F. COMMENTS:

A total of 60 spawns with mean time of April 3 have been recorded during two time periods: (1) 1930 to 1949 and (2) 1958 to 1978. Most spawns occurred near the head of Jervis Inlet, relatively far from the main spawns in the Strait of Georgia. This geographical distinction plus their late spawning time sets them apart from other locations but their periodic history is evidence that this was not a well established spawning stock. Instead, it may have been a 'transitory' stock which established for only short periods. It may be related to the adjacent Sechelt herring (section 165).

G. ROE FISHERIES:

No major roe fisheries are documented.

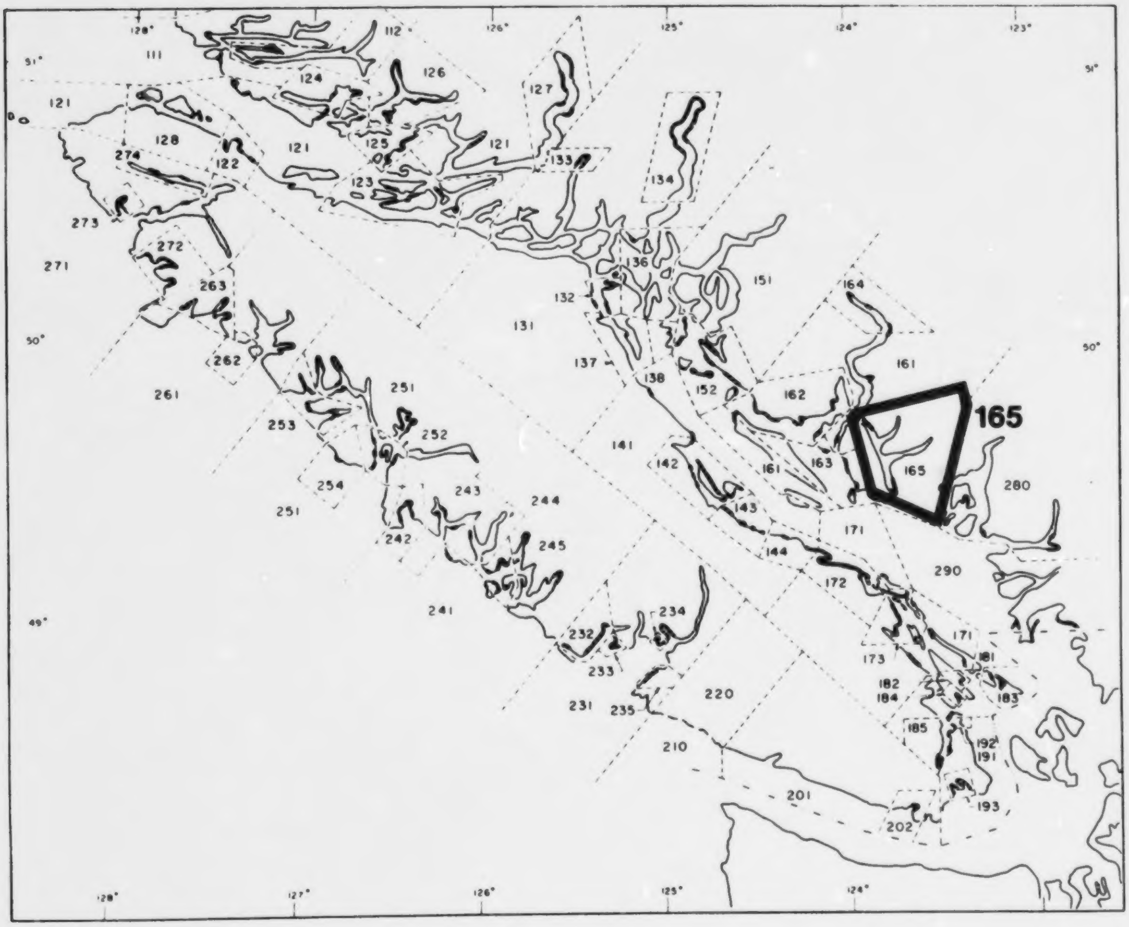

Fig. 165-1. Overview map showing location of section 165, Sechelt Inlet.

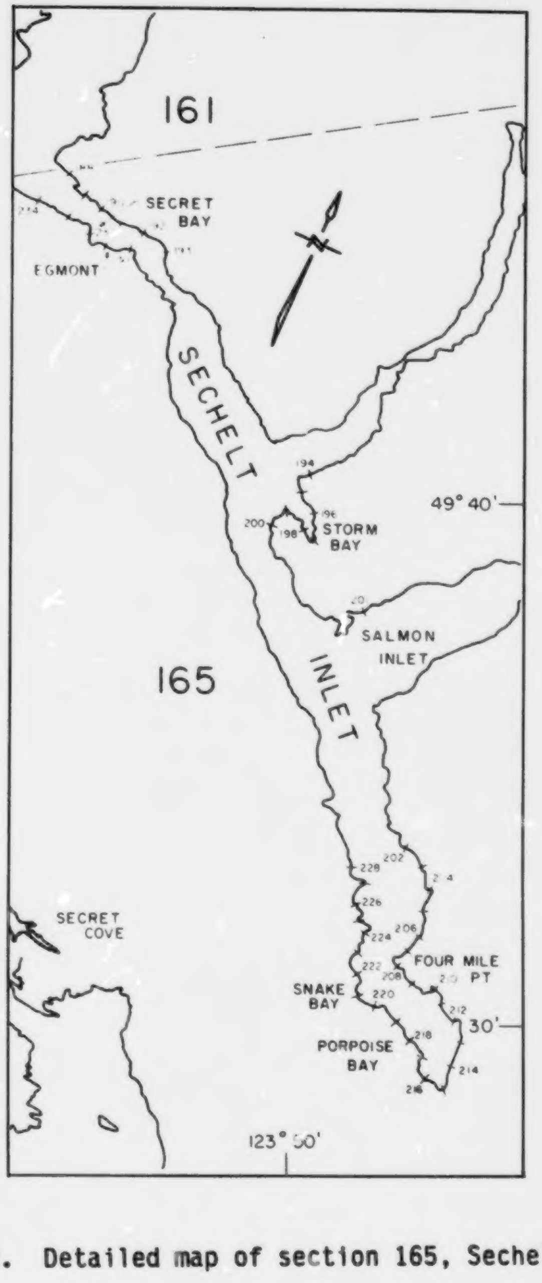

Fig. 165-2. Detailed map of section 165, Sechelt Inlet.

Table 165-1. Section 165 - Spawn position by year.

```
   195.00    205.00    215.00    225.00
      +----+----+----+----+----+----+----+---
1937 +                   aa
1938 +                   cc               aa
1939 +                   aa
1940 +     ^^            bb   b           aa
1941 +                  abba
1942 +                   aa
1943 +  a  ^^            aa   a
1944 +  a  ^^            ba   a
1945 +     ^^            aa
1946 +  a  ^^            aa               aa
1947 +  a                bb               aa
1948 +                  aaa
1949 +                   aa
1950 +                  aaaa
1951 +                 aaaaa
1952 +           aaaa    db
1953 +           aaa     cb
1954 +           aaa     aa   a
1955 +            aa     aa   a
1956 +                   2 11  11   11
1957 +                    121
1958 +                1211
1959 + 11         11  121   1111         1
1960 +                   $$
1961 +                    11              1
1962 +                1211 1              1
1963 +  aa      11     111111 111        11
1964 +                     1  a           a
1965 +                  1  1
1966 +                   1 1              1
1967 +                    11
1968 +                 1111               1
1969 +                 1211               1 1
1970 +  111             11 1
1971 +                   11
1972 +                   11
1973 +
1974 +                   1
1975 +
1976 +                   111
1977 +                   1
1978 +
1979 +
1980 +                   aa
1981 +                      11
1982 +                   11
1983 +
1984 +
1985 +
1986 +

      +----+----+----+----+----+----+----+---
   195.00    205.00    215.00    225.00
        S   ~     F      P    S           S E
        T   S     O      O    N           E G
        O   A     U      R    A           C M
        R   L     R      P    K           R O
        M   M            O    E           E N
            O     M      I                T T
        B   N     I      S    B
        A         L      E    A           B
        Y   I     E           Y           A
            N            B                Y
            L     P      A
            E     O      Y
            T     I
                  N
                  T
```

Table 155-2. Section 165 - histogram of cumulative spawn frequency over distance

```
                         position(km)
                                  0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                          194.00 +                                                                               0    0    0    0
                          195.00 +                                                                               0    0    0    0
                          196.00 +*                                                                              1    0    0    1
STORM BAY                 197.00 +**00000                                                                        2    5    0    7
                          198.00 +*0                                                                             1    1    0    2
                          199.00 +*                                                                              1    0    0    1
                          200.00 +IIIII                                                                          0    0    5    5
 SALMON INLET             201.00 +IIIII                                                                          0    0    5    5
                          202.00 +                                                                               0    0    0    0
                          203.00 +                                                                               0    0    0    0
                          204.00 +                                                                               0    0    0    0
                          205.00 +*                                                                              1    0    0    1
                          206.00 +*000                                                                           1    3    0    4
FOUR MILE POINT           207.00 +*0000                                                                          1    4    0    5
                          208.00 +*0000                                                                          1    4    0    5
                          209.00 +0                                                                              0    1    0    1
                          210.00 +                                                                               0    0    0    0
                          211.00 +***                                                                            3    0    0    3
                          212.00 +*********0                                                                     9    1    0   10
                          213.00 +*********0000                                                                  9    4    0   13
PORPOISE BAY              214.00 +****************00000000000000000000000000000000000                           16   35    0   51
                          215.00 +***********0000000000000000000000000000                                       11   28    0   39
                          216.00 +************000                                                               12    3    0   15
                          217.00 +*****                                                                          5    0    0    5
                          218.00 +**                                                                             2    0    0    2
SNAKE BAY                 219.00 +**0000000                                                                      2    7    0    9
                          220.00 +***                                                                            3    0    0    3
                          221.00 +**                                                                             2    0    0    2
                          222.00 +                                                                               0    0    0    0
                          223.00 +                                                                               0    0    0    0
                          224.00 +                                                                               0    0    0    0
                          225.00 +*                                                                              1    0    0    1
                          226.00 +*                                                                              1    0    0    1
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 165-2 (cont'd.)

```
                          position(km)
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                           227.00 +                                                                               0    0    0    0
                           228.00 +                                                                               0    0    0    0
                           229.00 +                                                                               0    0    0    0
                           230.00 +**                                                                             2    0    0    2
SECRET BAY                 231.00 +******0                                                                        6    1    0    7
                           232.00 +0000                                                                           0    4    0    4
EGMONT                     233.00 +*0000                                                                          1    4    0    5
                           234.00 +                                                                               0    0    0    0
                           235.00 +                                                                               0    0    0    0
                                  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                  0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 165-3. Herring statistical spawn summary for section 165.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	30793	804	0	7.0	78.0	0.00	78.0	78	78	1	1
1938	4	188359	4918	0	4.5	95.3	9.03	90.7	71	110	4	2
1939	1	30793	804	0	5.0	77.0	0.00	77.0	77	77	1	1
1940	6	137152	3581	0	6.3	75.7	4.22	73.7	63	87	5	4
1941	2	138608	3619	0	6.0	69.5	1.50	70.3	68	71	2	1
1942	1	35006	914	69	7.0	60.0	0.00	60.0	60	60	1	1
1943	4	66489	1736	46	3.5	81.3	4.21	80.4	69	88	4	4
1944	5	31521	823	83	4.2	67.8	3.92	64.4	57	79	5	4
1945	2	15741	411	69	8.0	77.0	0.00	77.0	77	77	1	2
1946	4	59480	1553	80	7.5	77.0	4.02	78.3	69	88	4	4
1947	4	52471	1370	46	6.5	70.8	5.14	75.1	59	84	4	3
1948	1	84030	2194	23	5.0	90.0	0.00	90.0	90	90	1	1
1949	1	45500	1188	46	5.0	79.0	0.00	79.0	79	79	1	1
1950	1	122522	3199	55	3.0	92.0	0.00	92.0	92	92	1	1
1951	1	150519	3930	73	4.0	99.0	0.00	99.0	99	99	1	1
1952	5	178555	4662	43	4.2	86.4	13.73	78.6	43	118	5	2
1953	4	145310	3794	29	5.8	105.5	5.24	98.2	95	115	4	2
1954	3	154004	4021	35	6.3	107.7	0.67	108.1	107	109	2	3
1955	3	131292	3428	34	5.7	100.3	4.33	101.2	96	109	2	3
1956	5	157528	4113	25	3.8	99.8	9.21	107.2	63	110	4	2
1957	3	54271	1417	68	3.3	79.3	7.84	80.4	71	95	3	1
1958	2	92418	2413	18	5.0	103.0	1.00	103.3	102	104	2	1
1959	7	157490	4112	12	3.0	93.1	4.18	94.9	72	110	3	5
1960	5	51092	1334	78	4.8	88.0	0.00	88.0	88	88	1	1
1961	2	52509	1371	64	5.5	84.5	9.50	87.7	75	94	2	2
1962	5	98010	2559	7	3.4	97.4	8.60	103.7	63	106	2	2
1963	6	250291	6535	9	6.0	73.3	5.10	73.7	62	98	3	4
1964	3	19227	502	4	3.7	81.7	4.18	84.3	77	90	3	3
1965	2	17503	457	2	3.0	78.0	4.00	75.6	74	82	2	1
1966	3	36768	960	18	3.7	86.3	3.53	87.9	81	93	3	2
1967	2	20988	548	3	5.0	79.0	0.00	79.0	79	79	1	1
1968	3	101533	2651	3	3.7	94.3	4.33	98.3	87	102	3	2
1969	5	64765	1691	39	4.6	90.6	11.16	99.6	51	109	4	3
1970	3	117275	3062	4	5.0	91.3	14.25	105.7	64	112	3	2
1971	1	38492	1005	91	1.0	83.0	0.00	83.0	83	83	1	1
1972	1	17503	457	2	3.0	100.0	0.00	100.0	100	100	1	1
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	1	7009	183	18	1.0	93.0	0.00	93.0	93	93	1	1
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	2	35006	914	6	3.0	96.0	0.00	96.0	96	96	1	1
1977	1	17503	457	9	1.0	97.0	0.00	97.0	97	97	1	1
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	1	59518	1554	69	1.0	103.0	0.00	103.0	103	103	1	1
1981	1	30793	804	9	0.0	111.0	0.00	111.0	111	111	1	1
1982	1	22980	600	150	0.0	93.0	0.00	93.0	93	93	1	1
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	118	3318618	86648	36	4.6	87.0	1.50	90.1	43	118	52	7

Table 165-4. Spawn summary for section 165 from 1937 to 1986.

A. GENERAL:

There is one main spawning area at the head of Sechelt Inlet centered in the Porpoise Bay vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Sechelt.

C. SPAWNING CONSISTENCY OVER TIME: CONSTANT

If pooled among all localities, there has been a nearly constant annual record of spawnings since 1937 except for the years, 1973, 1975, 1978-1979 and 1983-86.

D. MAGNITUDE OF SPAWNINGS: MEDIUM

1. NUMBER OF SPAWN YEARS/50 YEARS = 42/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 42/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 86.7 Km.
4. CUMULATIVE SPAWN AREA = 331.9 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 28 (87.0)
2. MEAN WEIGHTED DATE (DOY) = March 31 (90.1)

F. COMMENTS:

This small area has a nearly continuous record of 131 spawns with a time of March 28. Most spawns occurred at the head of the Inlet. This location is separated by nearly 20 NM and a shallow tidal narrows from adjacent spawning areas in Pender Harbour at Jervis Inlet. Probably a small non-migratory stock resides in Sechelt Inlet.

G. ROE FISHERIES:

No major roe fisheries are documented.

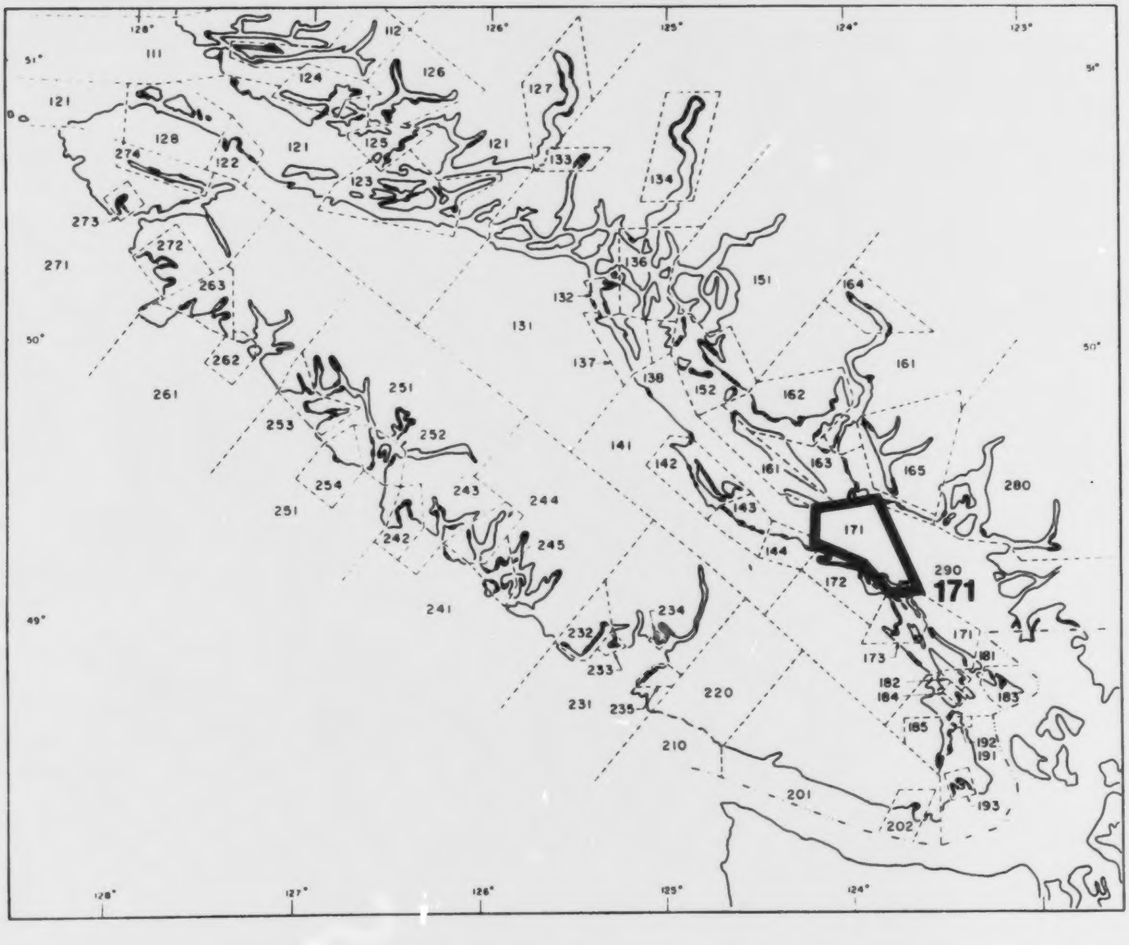

Fig. 171-1. Overview map showing location of section 171, Other Area 17.

Table 171-1. Section 171 - Spawn position by year.

```
     2.00
     +--
1937 +
1938 +
1939 +
1940 +
1941 +
1942 +
1943 +
1944 +
1945 +
1946 +
1947 +
1948 +
1949 +
1950 + a
1951 +
1952 +
1953 +
1954 +
1955 +
1956 +
1957 +
1958 +
1959 +
1960 +
1961 +
1962 +
1963 +
1964 +
1965 +
1966 + 11
1967 +
1968 +
1969 +
1970 +
1971 +
1972 +
1973 +
1974 +
1975 +
1976 +
1977 +
1978 +
1979 +
1980 +
1981 +
1982 +
1983 +
1984 +
1985 +
1986 +

     +--
     2.00
       W
       I
       L
       L
       Y

       I
       S
       L
       A
       N
       D
```

Table 171-2. Section 171 - histogram of cumulative spawn frequency over distance

```
                                 position(km)
                                        0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                                        +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                   1.00 +                                                                             0    0    0    0
                                   2.00 +                                                                             0    0    0    0
WILLY ISLAND                       3.00 +*0                                                                           1    1    0    2
                                   4.00 +*                                                                            1    0    0    1
                                   5.00 +                                                                             0    0    0    0
                                        +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                        0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 171-3. Herring statistical spawn summary for section 171.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	133679	4022	0	7.0	71.0	0.00	71.0	71	71	1	1
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1942	1	184864	5562	9	7.0	83.0	0.00	83.0	83	83	1	1
1943	1	213880	6435	32	7.0	99.0	0.00	99.0	99	99	1	1
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	3	260877	7849	64	4.3	83.0	0.58	82.1	82	84	3	1
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	2	60757	1828	8	6.0	77.0	5.00	73.0	72	82	2	2
1950	1	3656	110	5	5.0	85.0	0.00	85.0	85	85	1	1
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	1	897	27	4	5.0	51.0	0.00	51.0	51	51	1	1
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	1	308041	9268	23	7.0	79.0	0.00	79.0	79	79	1	1
1956	6	108751	3272	56	4.0	89.3	4.33	87.7	79	99	3	2
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1960	1	16718	503	27	5.0	84.0	0.00	84.0	84	84	1	1
1961	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1964	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	1	15189	457	3	3.0	88.0	0.00	88.0	88	88	1	1
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1969	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1972	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	19	1307311	39333	36	5.0	83.1	2.65	83.3	51	99	11	7

Table 171-4. Spawn summary for section 171 from 1937 to 1986.

A. GENERAL:

There is one main spawning area at Willy Island.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Chemainus and Crofton.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There have been intermittent spawnings from 1937 to 1966 with no recorded spawnings in other years.

D. MAGNITUDE OF SPAWNINGS: SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 11/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 11/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 39.3 Km.
4. CUMULATIVE SPAWN AREA = 130.7 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 24 (83.1)
2. MEAN WEIGHTED DATE (DOY) = March 24 (83.3)

F. COMMENTS:

The small spawning area (with infrequent spawnings) in this section (Willy Island) is near Chemainus and Crofton should be included in section 173 (Stuart Channel) because of close geographic proximity. It is noteworthy that section 171, has no spawning records on the outside (north and eastern) shores of Gabriola and Valdes Islands.

G. ROE FISHERIES:

No major roe fisheries are documented.

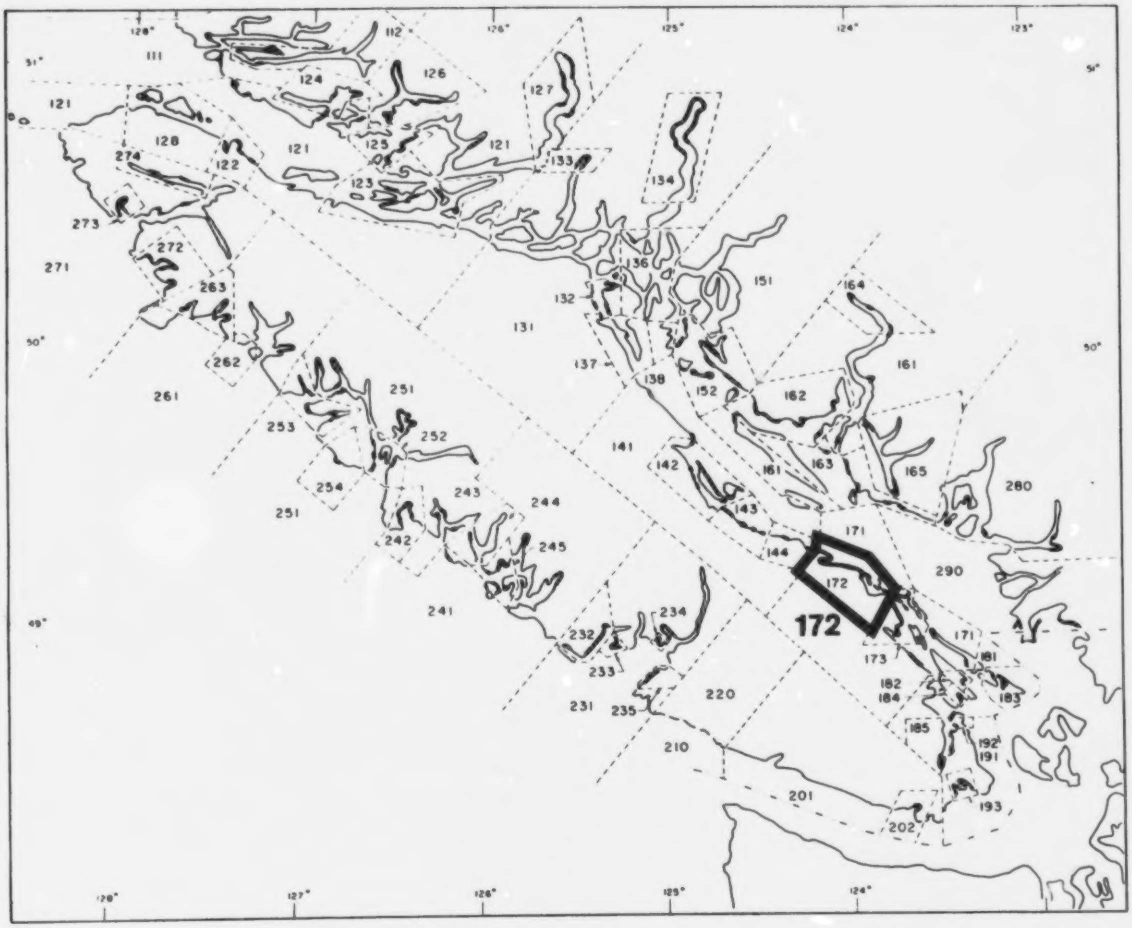

Fig. 172-1. Overview map showing location of section 172, Nanoose Bay.

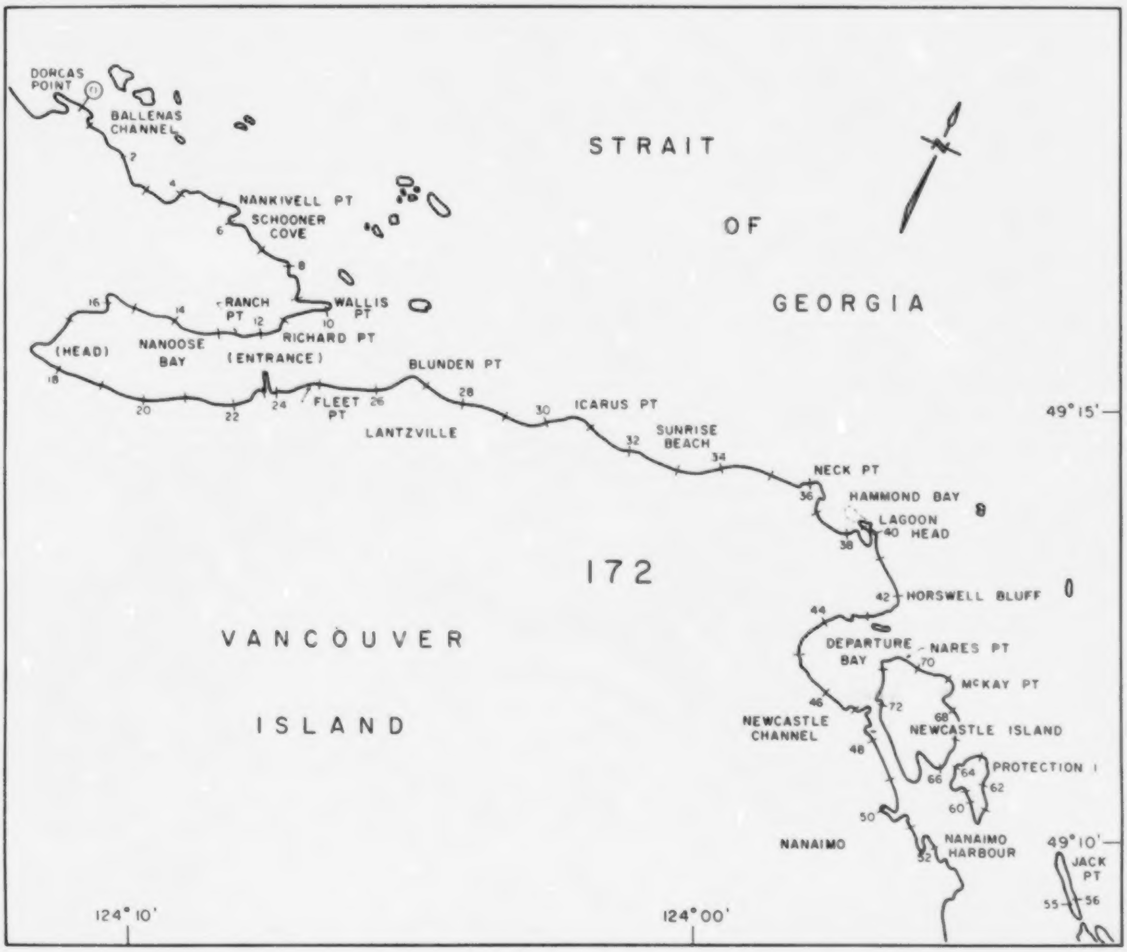

Fig. 172-2. Detailed map of section 172, Nanoose Bay.

Table 172-1. Section 172 - Spawn position by year.

```
     0.00     10.00     20.00     30.00     40.00     50.00
      +----+----+----+----+----+----+----+----+----+----+--
1937 +                 aabbbbba     aaaaaaaaaa aa bb ~~
1938 +                   abba   aaa         b aaaade ~~ ~~
1939 +                   aaaa   bcb               bb ~~ ~~
1940 +                  aaaa   bbcbba      aa  cc  a~~~~
1941 +                   bb    aaaaa       aa  aa aa
1942 +~~                                    b  aa ab
1943 +
1944 +                          aa          a  bb    ~~
1945 +                                      a  aa    ~~
1946 +
1947 +                    aaa   a
1948 +      a                               c        ~~
1949 +                    aa                      aa
1950 +      a              a                aaaaaabb~~~~
1951 +                aaaaa        aaabbaaaa aabbacc
1952 +                aabcba        aaa aa  a  aa bb
1953 +                aehbaa  aaaaabaaaaaa        cc
1954 +   aaaaaaab       a           aaa        aa ac
1955 +               bcfhfcbbbba                  ab
1956 +                111$$$$                     ab
1957 +                1111112111211111        111 1
1958 +                111$$$$a              b     1b
1959 +          121  11         12111
1960 +                1 11     2221 11    1  13111 21
1961 +                11  11     11
1962 +                 ag            11  11111
1963 +           1   1211   1                    1
1964 +               112 22
1965 +                   11                       211
1966 +                   aaa
1967 +                11  11 11 b                  1
1968 +        1122     32     1                    1
1969 +          11     11     111111
1970 +            11  22 111  1111431551 11$$1 11
1971 +    1222343221  12  111       1111
1972 +       1111     11 11$321  1   222111   112  a
1973 +                11111  11111  11111     11
1974 +333354123221111 111  12221543122221       21
1975 +  c       21 11 21 21  242223111111 1111113223     11
1976 +                211111  1324343311      112 11
1977 +  a             1111111321111223411         11
1978 +11       3$a    11111 12a$$$$a231  152  2 2
1979 +                1 1 123    11   231
1980 +                         abb accdb
1981 +               aabbaba        aba
1982 +                        abbbbaaaaa
1983 +                    be    a    b
1984 +                    aa
1985 +
1986 +                          a    bca
      +----+----+----+----+----+----+----+----+----+----+--
     0.00     10.00     20.00     30.00     40.00     50.00
       ~DN  S   W  R    N NN F  BL   I SN   HL  H  D  ~  ~
       BOA  C   A  A    A AA L  LA   C UE   AA  O  E  N  N
       ARN  H   L  N    N NN E  UN   A NC   MG  R  P  E  A
       LCK  O   L  C    O OO E  NT   R RK   MO  S  A  W  N
       LAI  O   I  H    O OO T  DZ   U I    OO  W  R  C  A
       ESV  N   S       S SS    EV   S SP   NN  E  T  A  I
       N E  E      P    E EE P  NI     EO   D   L  U  S  M
       APL  R   P  O         O   L   P  I    H  L  R  T  O
       SOL      O  I    B BB I  PL   O BN   BE     E  L
        I   C   I  N    A AA N  OE   I ET   AA  B     E
       CNP  O   N  T    Y YY T  I    N A    YD  L  B
```

Table 172-2. Section 172 - histogram of cumulative spawn frequency over distance

```
                          position(km)
                                0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0.00 +****I                                                                          4    0    1    5
 BALLENAS CHANNEL          1.00 +****I                                                                          4    0    1    5
DORCAS POINT               2.00 +***0000                                                                        3    4    0    7
NANKIVELL POINT            3.00 +***0                                                                           3    1    0    4
                           4.00 +******0                                                                        6    1    0    7
                           5.00 +******0                                                                        6    1    0    7
SCHOONER COVE              6.00 +***000                                                                         3    3    0    6
                           7.00 +*****0                                                                         5    1    0    6
                           8.00 +********0                                                                      8    1    0    9
                           9.00 +***********0                                                                  11    1    0   12
WALLIS POINT/RICHARD POIN 10.00 +*************000                                                              13    3    0   16
                          11.00 +**********0                                                                   10    1    0   11
                          12.00 +*****                                                                          5    0    0    5
RANCH POINT               13.00 +****                                                                           4    0    0    4
                          14.00 +**                                                                             2    0    0    2
                          15.00 +***000                                                                         3    3    0    6
                          16.00 +***********************0000000                                                23    7    0   30
                          17.00 +***********************0000000000000000000                                    23   19    0   42
NANOOSE BAY HEAD          18.00 +**************0000000000000000000000000000000000                              14   34    0   48
                          19.00 +***************00000000000000000000000000                                     15   26    0   41
NANOOSE BAY ENTRANCE      20.00 +*****************0000000000000000000000000000000000                           17   34    0   51
NANOOSE BAY               21.00 +*************00000000000000000000000000000000000                              13   35    0   48
                          22.00 +*****************00000000000                                                  17   11    0   28
FLEET POINT               23.00 +**************0000000                                                         14    7    0   21
                          24.00 +****************0000000                                                       16    7    0   23
                          25.00 +**************0000000000                                                      14   10    0   24
BLUNDEN POINT             26.00 +*********************0000000000000000000                                      21   19    0   40
LANTZVILLE                27.00 +*************************00000000000000000                                    25   17    0   42
                          28.00 +*********************00000000000                                              21   11    0   32
                          29.00 +**************000000000                                                       14    9    0   23
                          30.00 +****************000000000000                                                  16   12    0   28
ICARUS POINT              31.00 +************************0000000000000000                                      24   16    0   40
                          32.00 +*********************00000000000000000                                        21   17    0   38
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
```

Table 172-2 (cont'd.)

```
                                position(km)
                                      +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                      0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75    vara varb varc  all
SUNRISE BEACH +                 33.00 +*************0000000000                                                       13   10    0   23
NECK POINT                      34.00 +******000000                                                                   6    6    0   12
                                35.00 +****000000                                                                     4    6    0   10
                                36.00 +**********00000                                                               10    5    0   15
                                37.00 +*****000000000                                                                 5    9    0   14
HAMMOND BAY                     38.00 +***000000000000000000000                                                       3   21    0   24
LAGOON HEAD                     39.00 +****0000000                                                                    4    7    0   11
                                40.00 +**********00000                                                               10    5    0   15
                                41.00 +*******00000000000000000                                                       7   17    0   24
HORSWELL BLUFF                  42.00 +**************00000000000000000                                               14   17    0   31
                                43.00 +*****00000                                                                     5    5    0   10
                                44.00 +********000000000000000000000000                                               8   24    0   32
DEPARTURE BAY                   45.00 +**********0000000000000000000000000000000000                                  10   34    0   44
                                46.00 +**II                                                                           2    0    2    4
                                47.00 +IIIIIIIIIII                                                                    0    0   11   11
 NEWCASTLE C/ NEWCASTLE I       48.00 +IIIIIIIIIII                                                                    0    0   11   11
                                49.00 +II                                                                             0    0    2    2
                                50.00 +II                                                                             0    0    2    2
 NANAIMO                        51.00 +*II                                                                            1    0    2    3
                                52.00 +*                                                                              1    0    0    1
                                53.00 +                                                                               0    0    0    0
                                54.00 +I                                                                              0    0    1    1
 JACK POINT                     55.00 +I                                                                              0    0    1    1
                                56.00 +                                                                               0    0    0    0
                                57.00 +                                                                               0    0    0    0
                                58.00 +                                                                               0    0    0    0
                                59.00 +                                                                               0    0    0    0
                                60.00 +II                                                                             0    0    2    2
                                61.00 +IIIIIIIIIII                                                                    0    0   11   11
 PROTECTION IS. EAST            62.00 +IIIIIIIIIII                                                                    0    0   11   11
                                63.00 +II                                                                             0    0    2    2
                                64.00 +                                                                               0    0    0    0
                                65.00 +                                                                               0    0    0    0
                                      +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                      0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75    vara varb varc  all
```

Table 172-2 (cont'd.)

```
                         position(km)
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                         66.00 +                                                                             0    0    0    0
                         67.00 +                                                                             0    0    0    0
                         68.00 +IIIIII                                                                       0    0    6    6
MCKAY POINT              69.00 +IIIIII                                                                       0    0    6    6
                         70.00 +I                                                                            0    0    1    1
NARES POINT              71.00 +I                                                                            0    0    1    1
                         72.00 +                                                                             0    0    0    0
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 172-3. Herring statistical spawn summary for section 172.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	7	789847	22064	0	3.6	73.6	4.56	68.6	64	96	4	5
1938	16	451771	12620	0	5.1	76.7	4.69	66.2	53	112	13	9
1939	12	654316	18278	0	4.5	77.1	3.20	75.6	63	91	9	6
1940	10	606597	16945	0	6.0	75.0	3.47	69.9	63	95	10	6
1941	6	278723	7786	183	5.7	69.3	1.05	68.4	65	72	5	5
1942	10	66942	1870	52	6.2	78.7	4.21	79.8	65	99	9	5
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	6	62145	1736	22	2.3	56.8	1.17	57.7	52	59	4	4
1945	5	45821	1280	29	3.0	79.0	4.68	78.4	69	96	5	4
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	2	78541	2194	8	3.0	87.5	7.50	93.7	80	95	2	2
1948	7	97800	2732	7	5.6	61.4	2.43	63.1	47	65	4	4
1949	2	32719	914	27	3.0	73.0	7.00	71.6	66	80	2	2
1950	5	377705	10551	5	4.2	70.0	2.32	68.0	66	79	4	5
1951	8	694875	19411	15	4.3	78.1	2.84	83.5	67	85	4	5
1952	10	452165	12631	10	4.4	70.9	0.97	71.8	66	75	8	7
1953	15	809894	22624	12	4.7	82.4	2.38	88.9	67	98	10	7
1954	8	376058	10505	8	3.5	82.9	2.06	79.7	77	92	7	6
1955	10	1059227	29589	41	4.8	85.7	2.60	83.8	74	96	8	3
1956	11	271241	7577	47	4.5	82.7	2.28	86.6	69	91	6	3
1957	6	592350	16547	21	4.2	72.8	1.11	72.5	70	77	4	4
1958	13	452916	12652	83	2.8	72.3	2.88	71.6	61	86	10	5
1959	5	255204	7129	13	3.0	86.6	5.04	89.5	75	102	5	3
1960	17	312481	8729	46	5.5	65.4	0.85	66.1	61	73	6	7
1961	3	128909	3601	34	3.7	67.7	3.84	68.1	62	75	3	2
1962	11	249512	6970	49	4.1	78.0	3.59	73.4	67	97	5	5
1963	5	139039	3884	26	3.4	64.4	3.23	61.0	60	77	4	3
1964	6	125973	3519	28	1.8	61.2	5.29	63.5	48	79	5	1
1965	3	121033	3381	4	2.3	68.0	4.51	70.3	63	77	3	2
1966	1	65439	1828	4	3.0	66.0	0.00	66.0	66	66	1	1
1967	6	88314	2467	34	1.0	72.8	4.69	68.5	63	88	5	4
1968	7	253557	7083	89	3.6	70.4	2.40	69.1	58	76	5	3
1969	3	272244	7605	4	5.0	83.3	0.67	83.6	82	84	2	2
1970	25	703717	19658	30	5.2	75.9	1.85	73.8	58	91	8	8
1971	12	696916	19468	96	5.2	75.4	4.03	82.0	60	97	7	5
1972	18	595357	16631	30	3.2	73.2	2.35	74.1	55	88	10	6
1973	5	431867	12064	146	2.6	76.2	5.02	71.5	68	96	4	4
1974	26	1656767	46281	27	4.9	78.4	2.02	78.9	61	98	17	11
1975	32	1060158	29615	26	5.7	78.0	1.44	72.7	60	87	15	11
1976	16	834272	23305	76	4.1	75.1	0.64	75.3	69	80	8	6
1977	15	684637	19125	28	3.0	74.0	0.72	74.0	68	80	5	6
1978	32	776423	21689	54	4.1	75.6	1.49	75.1	67	98	10	11
1979	10	315774	8821	72	3.8	72.2	1.76	71.6	70	88	3	4
1980	6	484777	13542	63	2.3	85.5	0.56	85.8	83	87	4	3
1981	5	295548	8256	131	0.0	75.2	5.25	67.2	60	93	4	3
1982	4	521899	14579	298	0.0	73.0	6.78	72.3	63	93	4	3
1983	8	65510	1830	96	0.0	61.0	0.00	61.0	61	61	1	3
1984	1	35798	1000	5	0.0	80.0	0.00	80.0	80	80	1	1
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	4	96655	2700	30	0.0	95.5	1.19	95.1	94	99	3	3
All	455	19519432	545266	47	4.3	75.2	0.50	75.7	47	112	52	28

Table 172-4. Spawn summary for section 172 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section centered in the Nanoose Bay-Lantzville vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Nanoose and Nanaimo.

C. SPAWNING CONSISTENCY OVER TIME: CONSTANT

If pooled among all localities, there has been a nearly constant annual record of spawnings since 1937 except for the years, 1943, 1946 and 1985.

D. MAGNITUDE OF SPAWNINGS: VERY LARGE

1. NUMBER OF SPAWN YEARS/50 YEARS = 47/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 47/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 545.3 Km.
4. CUMULATIVE SPAWN AREA = 1951.9 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 16 (75.2)
2. MEAN WEIGHTED DATE (DOY) = March 17 (75.7)

F. COMMENTS:

Section 172 is one of the major spawning regions in Georgia Strait. It has 515 records from 1929 to 1986 with only a single year gap in 1943. The mean spawning date, March 16, is very similar to that of adjacent areas to the northwest (section 144, March 17) and therefore may be part of the same biological stock. However, it also could be part of fish spawning to the south in section 173. The evidence for stock separation is not clear (see comments for section 173).

G. ROE FISHERIES:

1. NUMBER OF SEINE FISHERY YEARS/15 YEARS = 5/15 (1972-86)
2. NUMBER OF GILLNET FISHERY YEARS/15 YEARS = 6/15 (1972-86)
3. MEAN SEINE CATCH/YEAR = 2458 tons
4. MEAN GILLNET CATCH/YEAR = 2635 tons

Table 172-5. History of roe fishery catches by gear type in Nanoose Bay.

SECT. 172	SEINE NET ROE FISHERIES				GILLNET ROE FISHERIES			
YEAR	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA
1972	/03	7.0	3700	Nanoose Bay	-	-	-	-
1973	01/03-13/03	288	1500	Nanoose Bay	01/03-13/03	288	1300	Nanoose Bay
1974	-	-	-	-	18/03-23/03	120	(3700)	Nanoose Bay & sect. 182
1975	27/03	28	240	Nanoose Bay	10/02-18/03	192	4475	Nanoose Bay
1976	-	-	-	-	29/02-17/03	312	2258	Nanoose Bay
1977	-	-	-	-	09/03-15/03	96	120	Nanoose Bay
1978	09/03-11/03	33	5050	Nanoose Bay	09/03-14/03	120	5024	Nanoose Bay
1979	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	02/03	6.0	1800	Nanoose Bay	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-

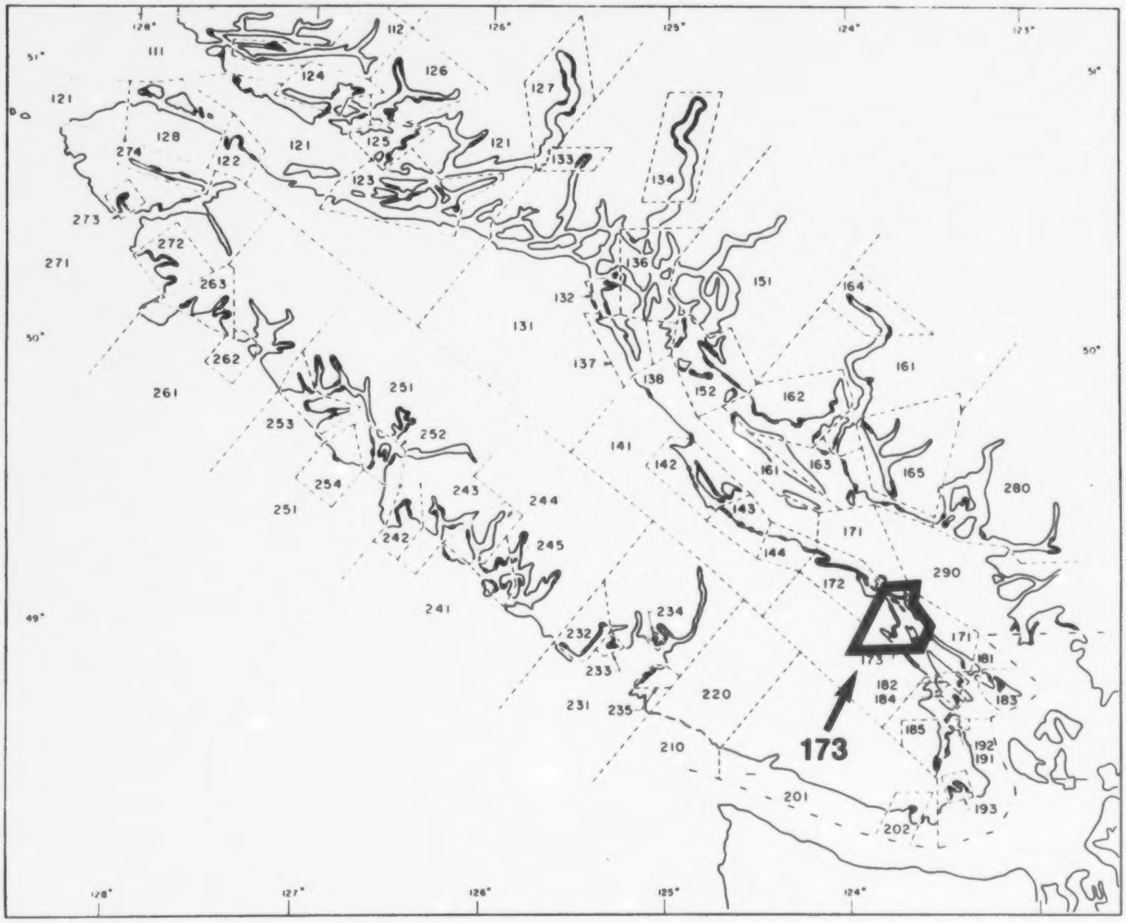

Fig. 173-1. Overview map showing location of section 173, Yellow Point.

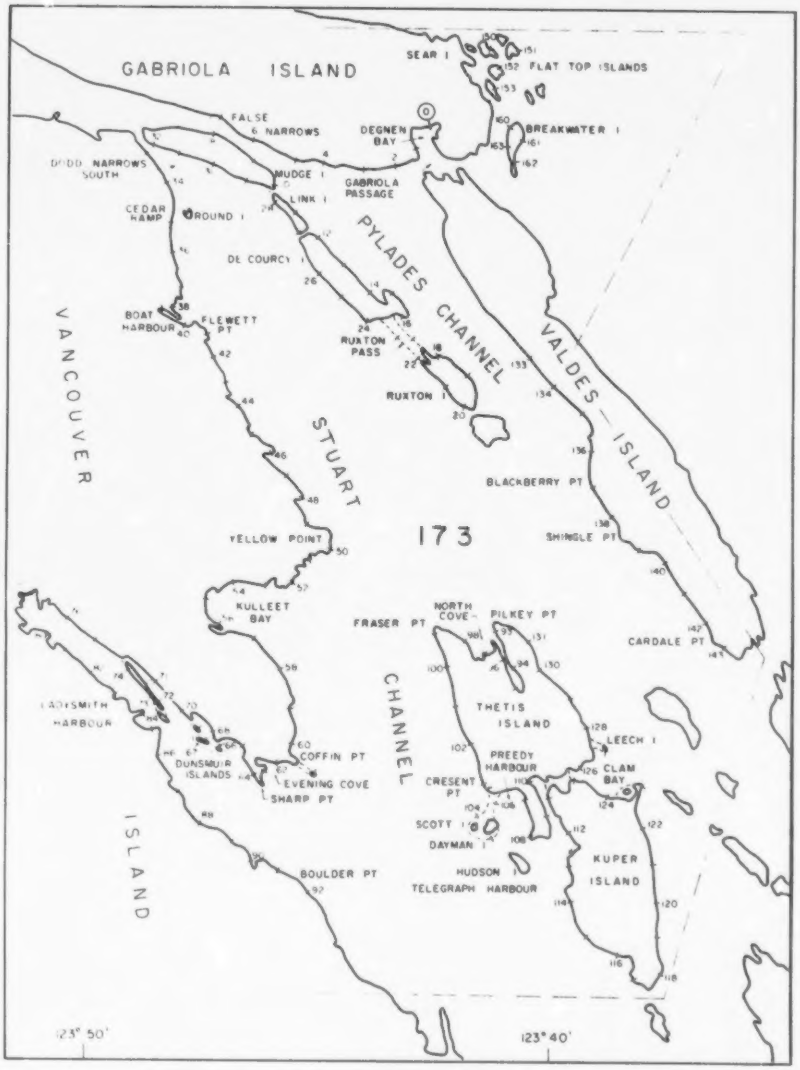

Fig. 173-2. Detailed map of section 173, Yellow Point.

Table 173-1. Section 173 - Spawn position by year.

```
    0.00      10.00     20.00     30.00     40.00     50.00     60.00     70.00     80.00     90.00    100.00
      +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
1937 +aa a aaba                                     aaaaaa    aa                  abba
1938 +     acca                                                                    bba
1939 +     aaaaa                        b aaaaa     aaaaaa  aaaaabaa              abba
1940 +                                                aa    abbbba                 bb
1941 +     aaaa                                                  aaa               ef          aaa
1942 +      ab                                aba             a                    aa
1943 +                                                                  b          aa
1944 +  aaa                                                                      abba
1945 +aa a                              a                   aaaaaa   a  aaa      aabbaa       aaaaa
1946 +                                               aaaa    aabbaaaaa  aaa       accaa       aaaaa
1947 +                           cc                         aaaaabba              adda
1948 +       a                   aa            a                  a  a  a        bbccbb
1949 +bbbbaaa                                                    aaa    a          cd          aaa
1950 +                                                        ca  b     bcb     aaaaaaaa                a
1951 +      ab                              a                aaa cccaaa a
1952 +  aa            ^^         aa                  bfea    bbbbcdcbca            ac          aaa    aa
1953 +aabbaaaaaaaa     abba      aa                  cdcb    afcfghhigdc c        ceec                 bb
1954 +                          bbbb       aaa      aabbaa  afgfcabaacaabaa        ff         aa&&&^  aa
1955 +                                aaaaa d                hc ab aca             bca         ab^^  aeea
1956 +                                                       1a$3$$$$$$a a 1       di      111 2 $1
1957 + 1111 11                    221                         21 21  1
1958 +                          a$$$11                aa 1 1$$$$$$$  1             ab      11
1959 +        111                 12221    111111111      11133    11 221111
1960 +    11                      111  112 211  11121   121212$1 2311                      1
1961 +   1                  1    111      11          12211111212$1a$$122 11              1111132
1962 +   1                       1111     121         122    111  1                         1
1963 +  121121     1111       1  1111  11112                      1     12
1964 + 11                    11     1221      bb        bb   111111121    1   1121           1133
1965 +                                                     11111 11
1966 +      bba                              ca                 22
1967 +                                 11 1    211
1968 +                            2       1                       2  1  1           11
1969 +                   11              1111         aa                      1         1
1970 + 11                                1121                      1131  1  22
1971 +                                     1                 111    2   1                            11 112
1972 +     11                              13             1     1121 21  1              11
1973 +                                 122121 2                 1 1       1
1974 +                                  11166 11  1     12122311121111                                  1
1975 +  112                              1111111111111 122   11   11 a  1  1            11              1
1976 + 1123211                             12  111 112111     1222131    a               1               111
1977 +1 13                               1 2    122111            2     1                        11
1978 + 1 11111                         111111 $$211122a$111    11  1$aa 1              11
1979 +   11                               1131              1331 a$3553122                1 13421^^     563
1980 +                                      a       abbbaa    aaaabaaaa                                cc
1981 +                                     aba                   aba                                  abba
1982 +                                      aa                bb aaa                                   aaa
1983 +                                     aaa         cc        abea                                  aaaaa
1984 +aa                                    ba        adda    abb efc
1985 +       a                                        aa      he                    aa                   aaa
1986 +                                      c   a            bfdabca               ab

      +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
    0.00      10.00     20.00     30.00     40.00     50.00     60.00     70.00     80.00     90.00    100.00
      D  P   F         ~ DR      ML     R C B  SF     Y       K   C  E   D           L          B ~   NF
      E  Y   A         R EU      UI     O E O  TL     E       U   O  V   U           A          O P   OR
      G  L   L         U  X      DN     U D A  UE     L       L   F  E   N           D          U I   RA
      N  A   S         X CT      GK     N A T  AW     L       L   F  N   S           Y          L L   TS
      E  D   E         T OO      E      D R    RE     O       E   I  I   M           S          D K   HE
      N  E             O UN       I         H  TT     W       E   N  N   U           M          E E    R
         S   N         N R       IS     I R A   T             T      G   I           I          R Y   C
      B  /   A           CI      SL     S A R  C      P           P      R           T                OP
      A      R         P YS      LA     L M B  HP     O       B   O  C               H          P P   VO
      Y      R         A  L      AN     A P O  AT     I       A   I  O   I                      O O   EI
             O         S IA      ND     N   U  N      N       Y   N  V   S           H          I I    N
             W         S SN      D      D + R         T           T  E   L           A          N N    T
             S            D                                              A           R          T T
```

```
Table 173-1.  Section 173 - spawn position by year.
   100.00    110.00    120.00    130.00    140.00
      +----+----+----+----+----+----+----+----+----+
1937 +    aaaaa                            ^^^^^^
1938 +                                      ^^^^
1939 +                                       ^^
1940 +   aaa&&&&^^^^^^^^^^                   ^^
1941 +
1942 +                 abbbbbbba
1943 +                                    ^^&^^^^^
1944 +           ^^      abbabbb
1945 +      b    ^^      aa   a
1946 +
1947 +
1948 +
1949 +                     a
1950 +
1951 +
1952 +      a
1953 + ^^^&aaaa ^^^^     aa deda
1954 +   ^&dddb  ^^        aaaaa          aaaa  aaa
1955 +     adb         bbeedb
1956 +      $            ac
1957 +
1958 +
1959 +      1                              221 1111
1960 +
1961 +
1962 +
1963 +                                   11      11
1964 +
1965 +
1966 +
1967 +
1968 +
1969 +
1970 +
1971 +21
1972 +
1973 +
1974 +                          1211
1975 +
1976 +11
1977 +
1978 +                                     ^^
1979 +331 aa         22$$aa44453332
1980 +  ^&cba           dd  dcaa
1981 +    aa           aaaaa
1982 +
1983 +aa  bcb
1984 +
1985 +
1986 +
      +----+----+----+----+----+----+----+----+----+
   100.00    110.00    120.00    130.00    140.00
         ~~TP      ~       K  C  L          B ~   C
         SDHR      T       U  L  E          L V   A
         CAEE      E       P  A  E          A A   R
         OYTE      L       E  M  C          C L   D
         TMID      E       R     H          K D   A
         TASY      G          B             B E   L
          N        R       I  A  I          E S   E
         I IH      A       S  Y  S          R
         SISA      P       L     L          R I   P
         LSLR      H       A     A          Y S   O
         ALAB              N     N            L   I
         NANO      H       D     D          P A   N
         DNDU                               / N   T
          D R                                 D
```

Table 173-2. Section 173 - histogram of cumulative spawn frequency over distance

```
                         position(km)
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
DEGNEN BAY                 0.00 +*000000                                                                      1    6    0    7
                           1.00 +*****0000000                                                                 5    7    0   12
                           2.00 +*******0000000                                                               7    7    0   14
PYLADES/GABRIOL/GABRIOL    3.00 +*************000000000                                                      13    9    0   22
                           4.00 +**********0000                                                              10    4    0   14
                           5.00 +******0000000                                                                6    7    0   13
                           6.00 +******0000000000000                                                          6   13    0   19
FALSE NARROWS              7.00 +****0000000000000000                                                         4   16    0   20
                           8.00 +*000000                                                                      1    6    0    7
                           9.00 +*00                                                                          1    2    0    3
                          10.00 +*0                                                                           1    1    0    2
                          11.00 +0                                                                            0    1    0    1
                          12.00 +                                                                             0    0    0    0
                          13.00 +*                                                                            1    0    0    1
                          14.00 +*                                                                            1    0    0    1
                          15.00 +*                                                                            1    0    0    1
                          16.00 +*I                                                                           1    0    1    2
 RUXTON PASS              17.00 +0I                                                                           0    1    1    2
                          18.00 +00                                                                           0    2    0    2
DE COURCY ISLAND          19.00 +*00                                                                          1    2    0    3
RUXTON ISLAND             20.00 +*0                                                                           1    1    0    2
                          21.00 +                                                                             0    0    0    0
                          22.00 +*                                                                            1    0    0    1
                          23.00 +**                                                                           2    0    0    2
                          24.00 +*                                                                            1    0    0    1
                          25.00 +                                                                             0    0    0    0
                          26.00 +000                                                                          0    3    0    3
MUDGE ISLAND              27.00 +****00000000000                                                              4   11    0   15
LINK ISLAND               28.00 +*************00000000000                                                    13   11    0   24
                          29.00 +***********000                                                              11    3    0   14
                          30.00 +**********                                                                  10    0    0   10
                          31.00 +***                                                                          3    0    0    3
                          32.00 +0                                                                            0    1    0    1
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 173-2 (cont'd.)

```
                          position(km)
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
                          33.00 +*****0                                                                         5    1    0    6
ROUND ISLAND/DODD NARROWS 34.00 +********0000                                                               8    4    0   12
                          35.00 +************0                                                             12    1    0   13
CEDAR RAMP +              36.00 +***************00                                                         15    2    0   17
                          37.00 +*******************************0000                                       31    4    0   35
BOAT HARBOUR              38.00 +***************0000000000000000000000                                     15   22    0   37
                          39.00 +***000000000                                                               3    9    0   12
                          40.00 +*******0000                                                                7    4    0   11
STUART CHANNEL            41.00 +********000000                                                             8    6    0   14
FLEWETT POINT             42.00 +********00                                                                 8    2    0   10
                          43.00 +*******                                                                    7    0    0    7
                          44.00 +********                                                                   8    0    0    8
                          45.00 +******                                                                     6    0    0    6
                          46.00 +*******0000                                                                7    4    0   11
                          47.00 +*****000000000000                                                          5   12    0   17
YELLOW POINT              48.00 +**0000000000000000000000000000000                                          2   31    0   33
                          49.00 +******00000000000000000000000000000                                        6   29    0   35
                          50.00 +*********000000000                                                         9    9    0   18
                          51.00 +************0000                                                          12    4    0   16
                          52.00 +*****                                                                      5    0    0    5
                          53.00 +*********                                                                  9    0    0    9
                          54.00 +************000000                                                        12    6    0   18
                          55.00 +*******************000000000000000000000                                  19   21    0   40
KULLEET BAY               56.00 +****************0000000000000000000000000000000000000000000000000000000000x   16   59    0   75
                          57.00 +********************00000000000000000000000000000000000000000              20   41    0   61
                          58.00 +***************00000000000000000000000                                    15   23    0   38
                          59.00 +*******************00000000000000000000000000000000000000000               19   41    0   60
COFFIN POINT (IS.)        60.00 +*****************************000000000000000000000000000000000000000000000x   29   55    0   84
                          61.00 +************00000000000000000000000000000000                              12   32    0   44
                          62.00 +**************00000000000000000000                                        14   20    0   34
                          63.00 +****************0000000000000000000000000                                 16   25    0   41
EVENING COVE              64.00 +********000000000000                                                       8   12    0   20
                          65.00 +***00000                                                                   3    5    0    8
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
```

Table 173-2 (cont'd.)

```
                         position(km)
                               +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                               0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                         66.00 +**************000000                                                         14    6    0   20
DUNSMUIR ISLAND          67.00 +**********0000000000000000                                                   10   16    0   26
                         68.00 +**00000                                                                       2    5    0    7
                         69.00 +***                                                                           3    0    0    3
                         70.00 +**                                                                            2    0    0    2
                         71.00 +*                                                                             1    0    0    1
                         72.00 +***                                                                           3    0    0    3
                         73.00 +*                                                                             1    0    0    1
                         74.00 +                                                                              0    0    0    0
                         75.00 +0                                                                             0    1    0    1
                         76.00 +0000                                                                          0    4    0    4
                         77.00 +000000000000                                                                  0   12    0   12
                         78.00 +000000000000000000000000000000000000000000000000000000                        0   54    0   54
LADYSMITH HARBOUR        79.00 +*000000000000000000000000000000000000000000000000000000000000000000           1   66    0   67
                         80.00 +*00000000000000                                                               1   14    0   15
                         81.00 +**00000                                                                       2    5    0    7
                         82.00 +*****0                                                                        5    1    0    6
                         83.00 +*                                                                             1    0    0    1
                         84.00 +                                                                              0    0    0    0
                         85.00 +*****                                                                         5    0    0    5
                         86.00 +****                                                                          4    0    0    4
                         87.00 +********                                                                      8    0    0    8
                         88.00 +*******                                                                       7    0    0    7
                         89.00 +*******000                                                                    7    3    0   10
                         90.00 +*****0000000                                                                  5    7    0   12
BOULDER POINT            91.00 +******0000000000I                                                             6   10    1   17
                         92.00 +**000000IIII                                                                  2    6    4   12
 PILKEY POINT            93.00 +000IIII                                                                       0    3    4    7
                         94.00 +I                                                                             0    0    1    1
                         95.00 +*                                                                             1    0    0    1
                         96.00 +*000                                                                          1    3    0    4
NORTH COVE               97.00 +00000000000000000                                                             0   17    0   17
FRASER POINT             98.00 +*********000000000000000000                                                   9   18    0   27
                               +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                               0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Tahle 173-2 (cont'd.)

```
                         position(km)
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varb varc  all
                          99.00 +********00000                                                                  8    5    0   13
                         100.00 +******0                                                                        6    1    0    7
                         101.00 +*****0                                                                         5    1    0    6
                         102.00 +*I                                                                             1    0    1    2
                         103.00 +0III                                                                           0    1    3    4
 SCOTT ISLAND            104.00 +00IIIIIII                                                                      0    2    7    9
 DAYMAN ISLAND           105.00 +0000000IIIII                                                                   0    7    5   12
THETIS ISLAND            106.00 +00000000000000000I                                                             0   17    1   18
PREEDY HARBOUR           107.00 +**0000000000000000000I                                                         2   19    1   22
                         108.00 +000000000000I                                                                  0   12    1   13
                         109.00 +0000I                                                                          0    4    1    5
                         110.00 +I                                                                              0    0    1    1
                         111.00 +II                                                                             0    0    2    2
                         112.00 +IIIIII                                                                         0    0    6    6
TELEGRAPH H/ HUDSON ISLA 113.00 +IIIIII                                                                         0    0    6    6
                         114.00 +II                                                                             0    0    2    2
                         115.00 +I                                                                              0    0    1    1
                         116.00 +I                                                                              0    0    1    1
                         117.00 +**0I                                                                           2    1    1    4
                         118.00 +**0000I                                                                        2    4    1    7
                         119.00 +*0000000I                                                                      1    7    1    9
                         120.00 +*000000000000000000                                                            1   18    0   19
KUPER ISLAND             121.00 +000000000000000000000                                                          0   21    0   21
                         122.00 +0000000000                                                                     0   10    0   10
                         123.00 +****000000000000                                                               4   12    0   16
CLAM BAY                 124.00 +****000000000000000                                                            4   15    0   19
                         125.00 +****00000000000                                                                4   11    0   15
                         126.00 +*****000                                                                       5    3    0    8
LEECH ISLAND             127.00 +****0                                                                          4    1    0    5
                         128.00 +*****                                                                          5    0    0    5
                         129.00 +****                                                                           4    0    0    4
                         130.00 +***                                                                            3    0    0    3
                         131.00 +                                                                               0    0    0    0
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varb varc  all
```

```
Table 173-2 (cont'd.)

                         position(km)
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varb varc  all
                          132.00 +                                                                               0    0    0    0
                          133.00 +                                                                               0    0    0    0
                          134.00 +                                                                               0    0    0    0
                          135.00 +                                                                               0    0    0    0
                          136.00 +*II                                                                            1    0    2    3
                          137.00 +*OIIIIII                                                                       1    1    6    8
BLACKBERRY P/ SHINGLE POI 138.00 +**000IIIIIIIII                                                                 2    3    9   14
                          139.00 +**OIIIIIIIIII                                                                  2    1   10   13
 VALDES ISLAND            140.00 +*OIIIIIIIIII                                                                   1    1   10   12
                          141.00 +IIIIIII                                                                        0    0    7    7
                          142.00 +*IIII                                                                          1    0    4    5
                          143.00 +*OII                                                                           1    1    2    4
CARDALE POINT             144.00 +**O                                                                            2    1    0    3
                          145.00 +**O                                                                            2    1    0    3
                          146.00 +                                                                               0    0    0    0
                          147.00 +                                                                               0    0    0    0
                          148.00 +                                                                               0    0    0    0
                          149.00 +I                                                                              0    0    1    1
 SEAR ISLAND              150.00 +III                                                                            0    0    3    3
                          151.00 +IIIII                                                                          0    0    5    5
 FLAT TOP ISLANDS         152.00 +IIIII                                                                          0    0    5    5
                          153.00 +II                                                                             0    0    2    2
                          154.00 +                                                                               0    0    0    0
                          155.00 +                                                                               0    0    0    0
                          156.00 +                                                                               0    0    0    0
                          157.00 +                                                                               0    0    0    0
                          158.00 +I                                                                              0    0    1    1
                          159.00 +IIIII                                                                          0    0    5    5
                          160.00 +IIIIIIIIIIII                                                                   0    0   12   12
 BREAKWATER ISLAND        161.00 +IIIIIIIIIIII                                                                   0    0   12   12
                          162.00 +IIIII                                                                          0    0    5    5
                          163.00 +I                                                                              0    0    1    1
                          164.00 +                                                                               0    0    0    0
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varb varc  all
```

Table 173-3. Herring statistical spawn summary for section 173.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	12	772308	27731	0	5.0	77.3	2.05	73.7	69	94	8	9
1938	7	331387	11899	0	6.7	77.4	6.44	74.0	59	110	6	4
1939	10	734627	26378	0	4.6	79.4	3.93	76.5	59	93	9	8
1940	9	888415	31900	0	5.9	68.0	4.81	71.3	52	99	7	7
1941	11	565104	20291	0	5.9	74.3	6.48	73.7	29	101	10	5
1942	10	544690	19558	77	6.4	78.0	3.07	74.1	65	89	8	7
1943	11	454094	16305	33	4.6	64.4	3.15	64.7	43	82	9	6
1944	8	384358	13801	61	6.0	78.6	6.55	84.3	64	117	7	5
1945	16	517007	18564	75	4.3	81.9	2.26	84.7	55	95	10	13
1946	8	716831	25739	10	7.3	75.6	4.37	72.7	62	94	6	6
1947	10	300557	10792	8	5.0	78.2	5.20	73.3	60	105	9	4
1948	9	353472	12692	10	5.9	78.3	6.22	77.2	55	111	7	7
1949	10	432733	15538	13	5.0	67.4	4.88	73.5	41	83	8	7
1950	10	312338	11215	11	4.2	71.4	5.57	73.6	42	88	8	5
1951	9	320721	11516	6	4.3	72.3	4.34	73.6	52	93	5	6
1952	24	814975	29263	12	5.6	82.4	3.27	83.7	43	109	18	11
1953	54	2893727	103904	12	6.4	73.8	1.38	74.4	47	102	27	18
1954	36	2035389	73084	10	6.3	79.8	2.40	80.9	49	113	17	18
1955	38	1128955	40537	46	5.1	77.0	1.95	79.8	62	122	16	11
1956	36	705023	25315	29	3.6	77.5	2.02	74.4	52	88	12	8
1957	9	259618	9322	31	3.1	75.9	3.98	77.9	52	91	7	4
1958	16	704299	25289	17	3.4	75.6	3.83	77.4	50	99	9	7
1959	16	946900	34000	19	3.8	68.3	1.96	69.7	48	81	13	10
1960	22	500966	17988	26	5.2	70.5	2.47	70.1	39	91	16	10
1961	25	630775	22649	11	4.2	74.5	2.02	74.2	57	94	13	12
1962	9	306601	11009	17	4.3	78.1	2.86	76.6	70	92	6	7
1963	18	446742	16041	23	4.6	78.3	2.60	76.4	62	103	12	9
1964	20	525641	18874	5	3.2	65.8	3.52	67.7	44	92	15	9
1965	2	109451	3930	5	2.0	63.5	3.50	65.7	60	67	2	2
1966	7	157826	5667	5	3.0	78.7	2.16	75.9	71	85	4	3
1967	5	61103	2194	29	2.6	84.2	1.20	84.0	80	86	3	3
1968	8	75111	2697	5	2.0	74.9	7.01	88.1	36	98	7	6
1969	6	71992	2585	3	3.3	84.8	0.60	84.2	83	87	5	5
1970	12	180747	6490	16	3.3	74.5	3.66	74.7	51	91	8	7
1971	9	171807	6169	13	3.7	89.0	4.32	91.0	63	100	6	5
1972	12	141255	5072	9	2.3	85.4	3.73	86.4	59	112	8	6
1973	10	173116	6216	32	2.8	83.2	4.75	80.4	46	99	5	4
1974	24	603259	21661	67	4.7	80.0	1.98	81.0	64	100	12	8
1975	14	556777	19992	10	4.9	83.2	3.23	84.7	57	100	9	10
1976	20	571454	20519	20	4.8	81.1	1.60	81.6	62	96	9	9
1977	15	271120	9735	35	3.1	73.3	1.66	73.4	65	89	6	8
1978	26	649741	23330	43	3.8	80.0	1.60	81.2	59	96	14	15
1979	48	1697820	60963	26	2.8	75.5	0.81	76.0	66	87	18	12
1980	26	799991	28725	31	2.5	85.3	1.60	77.3	67	99	17	12
1981	12	568697	20420	51	0.0	75.5	2.89	77.6	60	94	8	7
1982	6	204363	7338	161	0.0	72.3	4.28	72.8	59	85	4	5
1983	13	498515	17900	76	0.0	62.8	1.20	64.7	60	69	2	5
1984	17	557000	20000	38	0.0	84.2	3.01	80.8	76	116	6	6
1985	24	522188	18750	16	0.0	89.1	0.80	90.2	73	93	8	8
1986	23	524973	18850	26	0.0	81.0	2.14	78.7	74	101	6	7
All	812	1 28696560	030397	27	4.5	77.2	0.44	76.6	29	122	75	45

Table 173-4. Spawn summary for section 173 from 1937 to 1986.

A. GENERAL:

There are four main spawning areas in this section:

(i) Pylades Channel
(ii) Boat Harbour
(iii) Coffin Point and
(iv) Thetis-Kuper Islands

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Nanaimo and Ladysmith.

C. SPAWNING CONSISTENCY OVER TIME: CONSTANT

If pooled among all localities, there has been a constant annual record of spawnings since 1937.

D. MAGNITUDE OF SPAWNINGS: VERY LARGE

1. NUMBER OF SPAWN YEARS/50 YEARS = 50/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 50/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 1030.4 Km.
4. CUMULATIVE SPAWN AREA = 2869.7 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 18 (77.2)
2. MEAN WEIGHTED DATE (DOY) = March 18 (76.6)

F. COMMENTS:

Section 173 has a continuous record of spawning with 862 records from 1929 to 1986. The mean spawning date (March 18) is nearly identical to sections to the north indicating this may not be a separate stock. Analysis of anchor tag returns indicates that herring spawning from all parts of the Strait of Georgia overwinter in this section. Haegele found significant differences among different samples collected during the winter in this section. Also Hay et al. (1986) found significant differences in length-weight regressions between spawning fish captured in this section and those taken from more northern locations in the Strait of Georgia. Therefore the stock status of herring spawning in section 173 is not clear at the present time.

G. ROE FISHERIES:

1. NUMBER OF SEINE FISHERY YEARS/15 YEARS = 1/15 (1972-86)
2. NUMBER OF GILLNET FISHERY YEARS/15 YEARS = 0/15 (1972-86)
3. MEAN SEINE CATCH/YEAR = 3400 tons
4. MEAN GILLNET CATCH/YEAR = 0 tons

Table 173-5. History of roe fishery catches by gear type in Yellow Point.

SECT. 173	SEINE NET ROE FISHERIES				GILLNET ROE FISHERIES			
YEAR	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA
1972	-	-	-	-	-	-	-	-
1973	-	-	-	-	-	-	-	-
1974	-	-	-	-	-	-	-	-
1975	-	-	-	-	-	-	-	-
1976	-	-	-	-	-	-	-	-
1977	-	-	-	-	-	-	-	-
1978	-	-	-	-	-	-	-	-
1979	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-	-
1982	07/03-08/03	13	3400	Pylades Ch.	-	-	-	-
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-

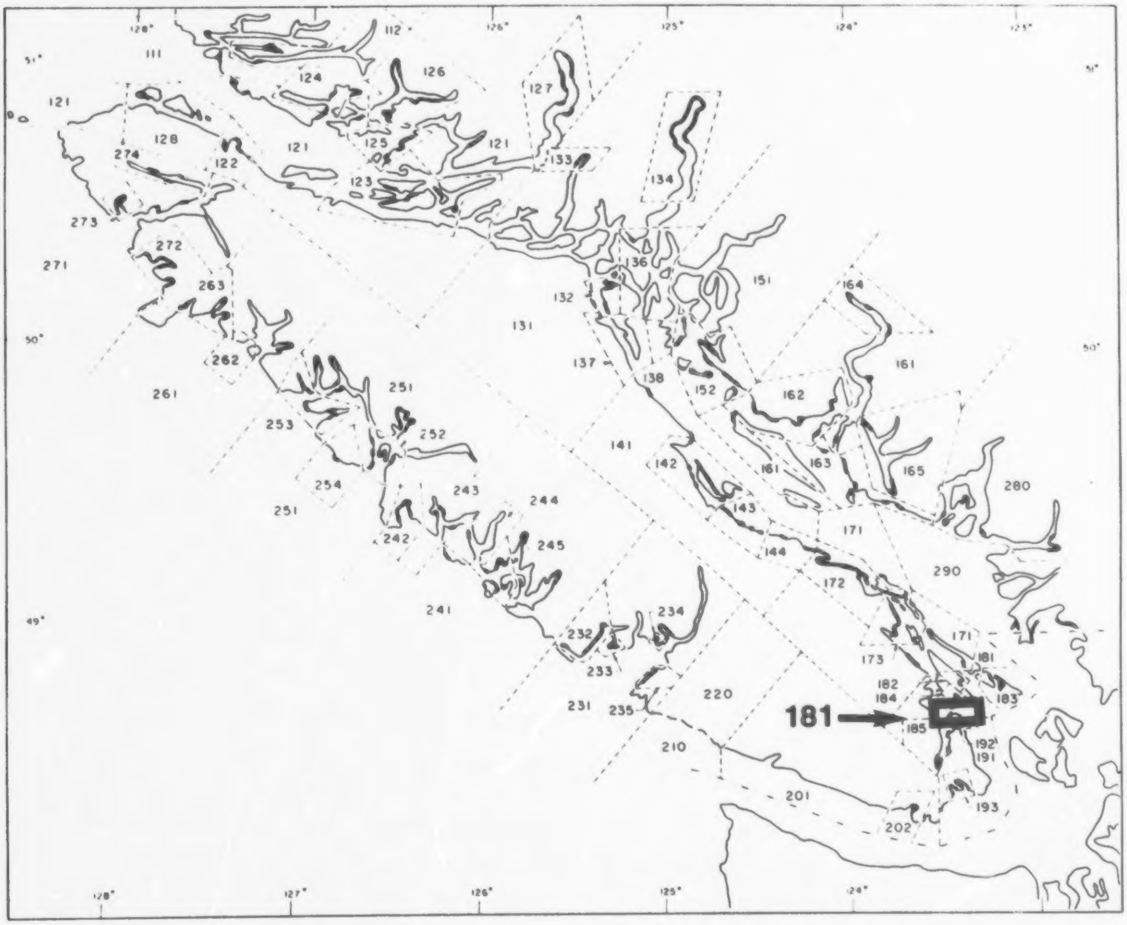

Fig. 181-1. Overview map showing location of section 181, Other Area 18.

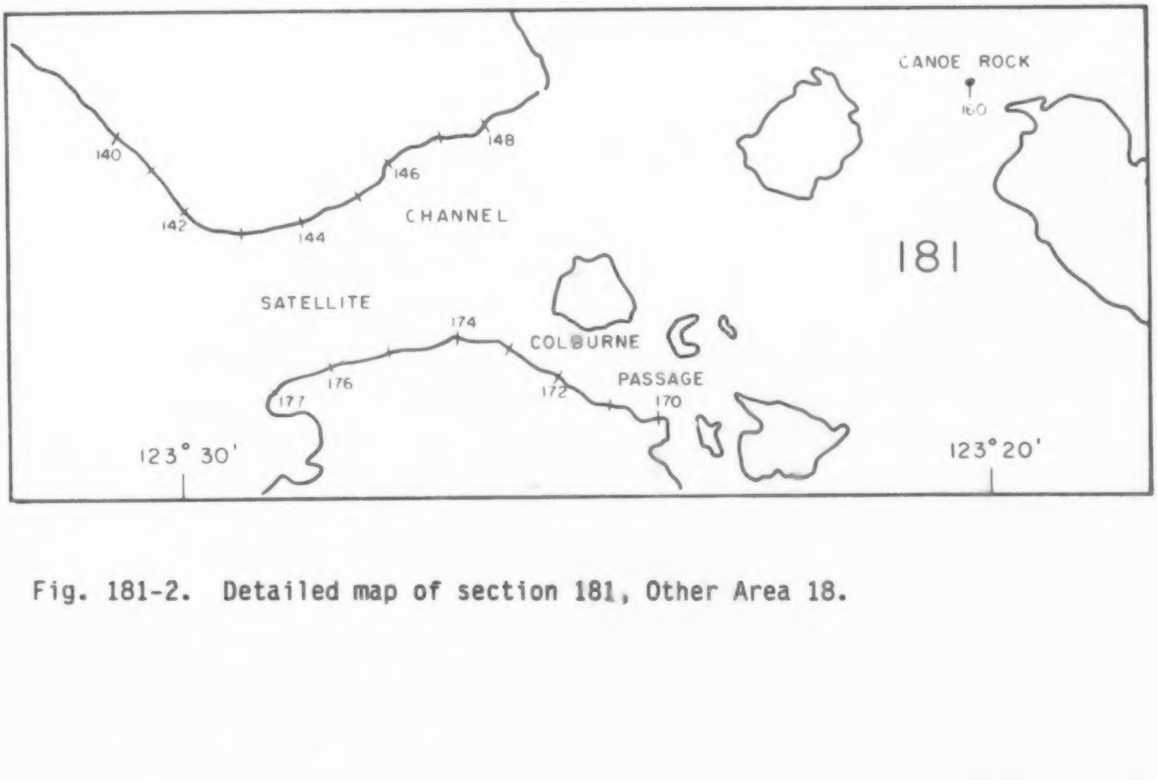

Fig. 181-2. Detailed map of section 181, Other Area 18.

Table 181-1. Section 181 - Spawn position by year.

```
   126.00
      +--
1937 +
1938 +
1939 +
1940 +
1941 +
1942 +
1943 +
1944 +
1945 +
1946 +
1947 +
1948 +
1949 +
1950 +
1951 +
1952 +
1953 +
1954 +
1955 +
1956 +
1957 +
1958 +
1959 +
1960 +
1961 +
1962 +
1963 +
1964 +
1965 +
1966 +
1967 +
1968 +
1969 + 1
1970 +
1971 +
1972 +
1973 +
1974 +
1975 +
1976 +
1977 +
1978 +
1979 +
1980 +
1981 +
1982 +
1983 +
1984 +
1985 +
1986 +
      +--
   126.00
        G
        E
        N
        O
        A

        B
        A
        Y
```

Table 181-2. Section 181 - histogram of cumulative spawn frequency over distance

```
                       position(km)
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                        97.00 +                                                                            0    0    0    0
                        98.00 +||                                                                          0    0    2    2
BIRDSEYE COVE           99.00 +||                                                                          0    0    2    2
                       100.00 +                                                                            0    0    0    0
                       101.00 +                                                                            0    0    0    0
                       102.00 +                                                                            0    0    0    0
                       103.00 +                                                                            0    0    0    0
                       104.00 +                                                                            0    0    0    0
                       105.00 +                                                                            0    0    0    0
                       106.00 +                                                                            0    0    0    0
                       107.00 +                                                                            0    0    0    0
                       108.00 +                                                                            0    0    0    0
                       109.00 +                                                                            0    0    0    0
                       110.00 +                                                                            0    0    0    0
                       111.00 +                                                                            0    0    0    0
                       112.00 +                                                                            0    0    0    0
                       113.00 +                                                                            0    0    0    0
                       114.00 +                                                                            0    0    0    0
                       115.00 +                                                                            0    0    0    0
                       116.00 +                                                                            0    0    0    0
                       117.00 +                                                                            0    0    0    0
                       118.00 +                                                                            0    0    0    0
                       119.00 +                                                                            0    0    0    0
                       120.00 +                                                                            0    0    0    0
                       121.00 +                                                                            0    0    0    0
                       122.00 +                                                                            0    0    0    0
                       123.00 +                                                                            0    0    0    0
                       124.00 +                                                                            0    0    0    0
                       125.00 +                                                                            0    0    0    0
                       126.00 +                                                                            0    0    0    0
GENOA BAY              127.00 +*                                                                           1    0    0    1
                       128.00 +                                                                            0    0    0    0
                       129.00 +                                                                            0    0    0    0
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 181-2 (cont'd.)

```
                       position(km)
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                       130.00 +                                                                               0    0    0    0
                       131.00 +                                                                               0    0    0    0
                       132.00 +                                                                               0    0    0    0
                       133.00 +                                                                               0    0    0    0
                       134.00 +                                                                               0    0    0    0
                       135.00 +                                                                               0    0    0    0
                       136.00 +                                                                               0    0    0    0
                       137.00 +                                                                               0    0    0    0
                       138.00 +                                                                               0    0    0    0
                       139.00 +                                                                               0    0    0    0
                       140.00 +                                                                               0    0    0    0
                       141.00 +                                                                               0    0    0    0
                       142.00 +                                                                               0    0    0    0
                       143.00 +                                                                               0    0    0    0
                       144.00 +I                                                                              0    0    1    1
SATELLITE CHANNEL      145.00 +I                                                                              0    0    1    1
                       146.00 +                                                                               0    0    0    0
                       147.00 +                                                                               0    0    0    0
                       148.00 +                                                                               0    0    0    0
                       149.00 +                                                                               0    0    0    0
                       150.00 +                                                                               0    0    0    0
                       151.00 +                                                                               0    0    0    0
                       152.00 +                                                                               0    0    0    0
                       153.00 +                                                                               0    0    0    0
                       154.00 +                                                                               0    0    0    0
                       155.00 +                                                                               0    0    0    0
                       156.00 +                                                                               0    0    0    0
                       157.00 +                                                                               0    0    0    0
                       158.00 +                                                                               0    0    0    0
                       159.00 +I                                                                              0    0    1    1
CANOE ROCK             160.00 +I                                                                              0    0    1    1
                       161.00 +                                                                               0    0    0    0
                       162.00 +                                                                               0    0    0    0
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 181-2 (cont'd.)

```
                      position(km)
                             +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                             0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                      163.00 +                                                                                0    0    0    0
                      164.00 +                                                                                0    0    0    0
                      165.00 +                                                                                0    0    0    0
                      166.00 +                                                                                0    0    0    0
                      167.00 +                                                                                0    0    0    0
                      168.00 +                                                                                0    0    0    0
                      169.00 +                                                                                0    0    0    0
                      170.00 +                                                                                0    0    0    0
                      171.00 +III                                                                             0    0    3    3
COLBURNE PASSAGE      172.00 +III                                                                             0    0    3    3
                      173.00 +                                                                                0    0    0    0
                             +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                             0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 181-3. Herring statistical spawn summary for section 181.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	1	6091	366	0	3.0	54.0	0.00	54.0	54	54	1	1
1941	1	2280	137	0	3.0	43.0	0.00	43.0	43	43	1	1
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	1	12166	731	5	3.0	89.0	0.00	89.0	89	89	1	1
1959	2	7606	457	23	4.0	81.0	2.00	80.6	79	83	2	1
1960	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1961	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1964	1	12932	777	18	9.0	81.0	0.00	81.0	81	81	1	1
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1969	1	3046	183	9	3.0	83.0	0.00	83.0	83	83	1	1
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1972	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	1	915	55	5	1.0	89.0	0.00	89.0	89	89	1	1
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	8	45036	2706	14	3.8	75.1	6.03	77.8	43	89	6	5

Table 181-4. Spawn summary for section 181 from 1937 to 1986.

A. GENERAL:

There are three main spawning areas in this section:

(i) Satellite Channel-Colburne Passage
(ii) Birdseye Cove (not shown on chart)
(iii) Genoa Bay (not shown on chart)

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Sidney, Maple Bay and Cowichan Bay.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There have been only intermittent spawnings since 1937.

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 7/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 7/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 2.7 Km.
4. CUMULATIVE SPAWN AREA = 4.5 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 16 (75.1)
2. MEAN WEIGHTED DATE (DOY) = March 19 (77.8)

F. COMMENTS:

Section 181 is not a signficant herring spawning area.

G. ROE FISHERIES:

No major roe fisheries are documented.

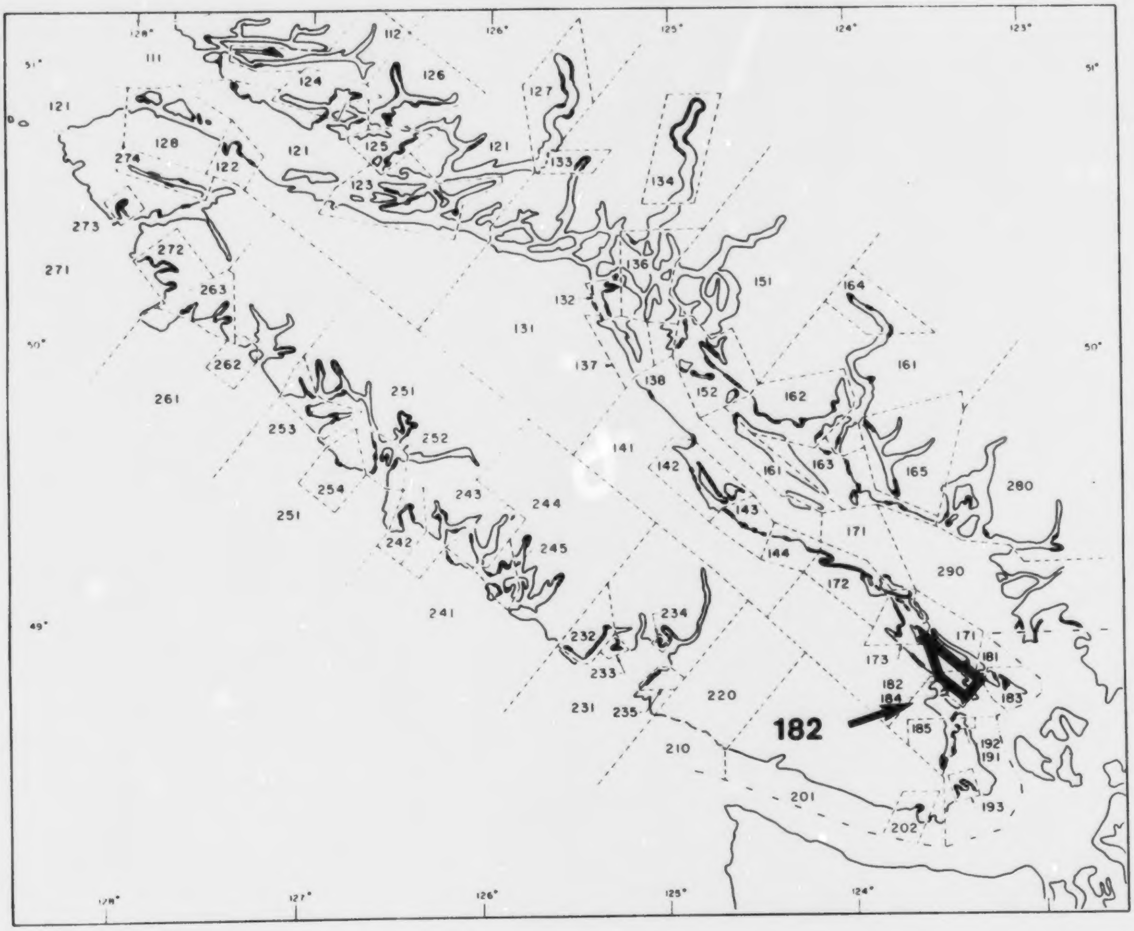

Fig. 182-1. Overview map showing location of section 182, Ganges Harbour.

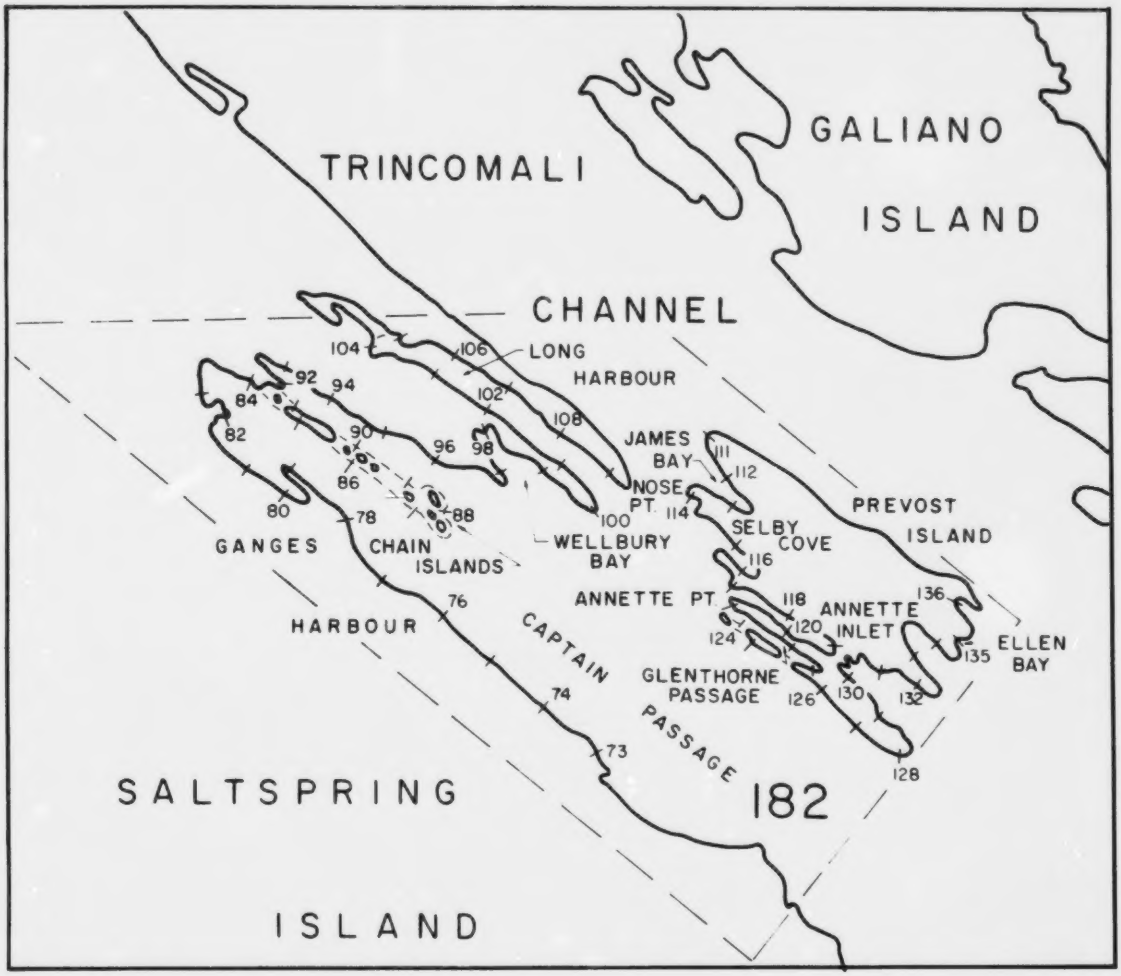

Fig. 182-2. Detailed map of section 182, Ganges Harbour.

Table 182-1. Section 182 - Spawn position by year.

```
    74.00     84.00     94.00    104.00    114.00    124.00
      +----+----+----+----+----+----+----+----+----+----+----+
1937 +
1938 +        aa                   aaa                    ^^
1939 +        ac                                          ^^
1940 +         a                    a                     ^^
1941 +         a                                          ^^
1942 +        cda                                 a       ^^
1943 +         a                   bba                    ^^
1944 +         a                                          ^^
1945 +         d                                          ^^
1946 +        aa                                  b       ^^
1947 +         d             aa     a                     ^^
1948 +         e    ed                         b  a       ^^
1949 +        ag             aa     b          baabaa b   ^^
1950 +         g                               a  a       ^^
1951 +                 1  1                     1
1952 +      21 $1   1 12 32  11     121       1132  2 1
1953 +     21411     1 4 31  11       1 11    22131 2
1954 +^ 333 2   312       1         a         2123b 43  1
1955 +^       eeb            aa                b aca cdb
1956 +        b$a 1 a        $b     c   1   1a   1g  aa     1
1957 +      11 1       1      1             111  1  2
1958 +      11$g    b1 11    $$  11af         a$ 2d  a$
1959 +                  222  11         11     11     1
1960 +  111    111 11      1121                1 11
1961 +  11   1 131    2   1   1               11 3   11
1962 +   11   111   1    11                    1    1 1
1963 +         121               21  111       1 2
1964 +  111 1   1            2                 112    1
1965 +    1 11 11                    11        3211
1966 +      11  1 1              11              12  11
1967 +    1 11 11    1           1 1 11 12     1 21 1
1968 +    1    121111           121  111       1 2133
1969 +  1111    11       1111   4532121112       12211211
1970 + 1311111122   111211111   114$a$3323    133322221
1971 +  21111 2 21     113111221 1   2214     22353 6421
1972 +        cka   1           343$g 121   11 24323121
1973 +    4211 2211 21 1 43 2531121  12322    124621211 1
1974 + 1433112   1111      121   22     1     1131  111
1975 + 21452   21 1   11 2   331 1111 3 22      11  21 11
1976 +  113    $      13      2  1    21221     11  11 11
1977 +  562141      2        21       1 2     1131   31  2
1978 +  248224 $112 212211   22         2     14631 1 11 1
1979 +  452       1231   311221 2  1         3 35       1
1980 +  211       1       11 11 112 121         16   1  1
1981 +  134121      1  1          2 1          113   3  21
1982 +  211          2  1    113                  3  11
1983 +                                            a
1984 +
1985 +                                        aa ada
1986 +                                          aaaaa
      +----+----+----+----+----+----+----+----+----+----+----+
    74.00     84.00     94.00    104.00    114.00    124.00_
      ~        G    C        W      L    N   J S AA   G    ~
      C        A    H        E      O    O   A E NN   L    P
      A        N    A        L      N    S   M L NN   E    R
      P        G    I        B      G    E   E B EE   N    E
      T        E    N        U               S Y TT   T    V
      A        S             R      H    P       TT   H    O
      I             I        Y      A    O   B C EE   O    S
      N        H    S               R    I   A O      R    T
               B    L        B      B    N   Y V PI   N
      P        R    A        A      O    T     E TN   E    I
      A             N        Y      U            .L        S
      S             D               R             E   P
      S             S                              T
```

Table 132-2. Section 132 - histogram of cumulative spawn frequency over distance

```
                       position(km)
                              0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                        72.00 +                                                                              0    0    0    0
                        73.00 +III                                                                           0    0    3    3
CAPTAIN PASSAGE         74.00 +III                                                                           0    0    3    3
                        75.00 +****                                                                          4    0    0    4
                        76.00 +**********************************                                           34    0    0   34
                        77.00 +**************************************                                       38    0    0   38
                        78.00 +*********************************************                                45    0    0   45
                        79.00 +**************                                                               14    0    0   14
                        80.00 +***********************                                                      23    0    0   23
                        81.00 +*********************0                                                       21    1    0   22
                        82.00 +******000000000000000000000                                                   6   21    0   27
GANGES HARBOUR          83.00 +*********************000000000000000000000000000000000000000000000000000000x  21   78    0   99
                        84.00 +**************************000000                                             26    6    0   32
                        85.00 +**********                                                                   10    0    0   10
                        86.00 +***********                                                                  11    0    0   11
                        87.00 +****                                                                          4    0    0    4
CHAIN ISLANDS           88.00 +******************00000000                                                   18    8    0   26
                        89.00 +*********0000                                                                 9    4    0   13
                        90.00 +*********                                                                     9    0    0    9
                        91.00 +*********************                                                        21    0    0   21
                        92.00 +******                                                                        6    0    0    6
                        93.00 +*********************                                                        21    0    0   21
                        94.00 +*******************                                                          19    0    0   19
                        95.00 +*******                                                                       7    0    0    7
                        96.00 +**********                                                                   10    0    0   10
WELBURY BAY             97.00 +****************************000000000                                    28    9    0   37
                        98.00 +**************************000000                                             26    6    0   32
                        99.00 +****                                                                          4    0    0    4
                       100.00 +***********                                                                  11    0    0   11
                       101.00 +***************************                                                  27    0    0   27
                       102.00 +**********************                                                       22    0    0   22
                       103.00 +******00000000000                                                             6   11    0   17
LONG HARBOUR           104.00 +******0000000000000000000000000                                               6   25    0   31
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 182-2 (cont'd.)

```
                    position(km)
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
                    105.00 +**************000                                                             14    3    0   17
                    106.00 +*********************                                                         21    0    0   21
                    107.00 +************                                                                  12    0    0   12
                    108.00 +************************                                                      24    0    0   24
NOSE POINT          109.00 +****************                                                              16    0    0   16
                    110.00 +*                                                                              1    0    0    1
                    111.00 +                                                                               0    0    0    0
                    112.00 +***                                                                            3    0    0    3
JAMES BAY           113.00 +**0                                                                            2    1    0    3
                    114.00 +*****************00                                                           17    2    0   19
SELBY COVE          115.00 +********************************000000000                                     32    9    0   41
                    116.00 +********************************************00                                44    2    0   46
ANNETTE PT.         117.00 +********************************************************************0000      68    4    0   72
ANNETTE INLET       118.00 +*******************00000000000000000000000000000                              19   29    0   48
                    119.00 +***********0000                                                               11    4    0   15
                    120.00 +*********************************00                                           33    2    0   35
                    121.00 +**************************00000                                               26    5    0   31
GLENTHORNE PASSAGE  122.00 +*****************000000000                                                    17    9    0   26
                    123.00 +*****00                                                                        5    2    0    7
                    124.00 +********                                                                       8    0    0    8
                    125.00 +*****                                                                          5    0    0    5
                    126.00 +IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII                                             0    0   34   34
PREVOST ISLAND      127.00 +IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII                                             0    0   34   34
                    128.00 +*                                                                              1    0    0    1
                    129.00 +                                                                               0    0    0    0
                    130.00 +                                                                               0    0    0    0
                    131.00 +                                                                               0    0    0    0
                    132.00 +                                                                               0    0    0    0
                    133.00 +                                                                               0    0    0    0
                    134.00 +II                                                                             0    0    2    2
ELLEN BAY           135.00 +II                                                                             0    0    2    2
                    136.00 +                                                                               0    0    0    0
                           +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75 vara varh varc  all
```

Table 182-3. Herring statistical spawn summary for section 182.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	1	0	0	0	5.0	65.0	0.00	0.0	65	65	1	1
1938	4	45106	3428	0	4.5	55.5	6.38	61.7	38	65	3	3
1939	5	25500	1938	0	4.0	52.6	6.54	57.2	30	71	3	3
1940	4	14921	1134	0	3.5	45.8	6.41	49.6	35	62	4	3
1941	2	16237	1234	0	4.0	43.0	0.00	43.0	43	43	1	2
1942	7	50737	3856	65	3.6	53.3	3.22	56.8	41	63	5	3
1943	6	64119	4873	106	3.7	53.2	3.03	50.4	46	66	6	3
1944	2	3618	275	91	1.0	38.0	1.00	38.7	37	39	2	2
1945	12	19895	1512	51	2.8	56.3	2.09	61.1	45	71	11	2
1946	5	19000	1444	100	2.6	58.0	4.58	59.1	47	67	3	3
1947	13	34224	2601	59	3.6	49.0	3.00	48.8	28	65	13	4
1948	16	55948	4252	56	3.4	59.1	4.63	63.9	21	76	9	5
1949	22	131475	9992	70	3.9	55.5	2.70	52.9	38	89	15	7
1950	10	20566	1563	17	2.0	56.1	5.03	59.8	38	91	5	4
1951	3	4934	375	21	1.0	81.0	6.51	75.5	68	88	3	2
1952	33	89185	6778	27	1.6	50.8	3.22	54.1	18	88	17	6
1953	32	68685	5220	21	2.6	51.5	2.52	55.1	28	79	25	5
1954	34	85211	6476	11	2.1	59.8	2.85	63.2	26	82	27	5
1955	17	185804	14121	15	1.8	60.0	2.84	64.1	43	94	10	6
1956	28	99922	7594	16	1.6	56.6	3.51	48.0	26	78	11	7
1957	9	29224	2221	11	2.8	55.0	4.06	56.2	39	72	7	5
1958	32	186330	14161	27	4.1	58.7	1.50	61.4	32	67	13	7
1959	7	68553	5210	13	3.0	64.1	6.26	64.8	47	95	6	5
1960	8	78172	5941	9	2.5	59.0	3.05	58.0	46	73	6	5
1961	15	76343	5802	13	1.9	64.5	3.18	64.8	42	86	10	6
1962	7	41487	3153	10	3.6	72.6	2.09	73.7	65	82	5	5
1963	8	75764	5758	12	4.0	65.4	2.74	68.5	55	77	6	4
1964	9	57724	4387	15	3.4	49.3	3.64	52.3	36	65	6	5
1965	10	71448	5430	41	2.8	64.8	2.06	64.5	52	69	5	4
1966	9	47514	3611	25	2.1	55.6	2.65	56.3	47	66	6	5
1967	13	63816	4850	10	2.5	55.4	3.06	56.6	37	69	11	4
1968	18	137225	10429	22	2.9	58.8	2.38	58.8	45	76	12	4
1969	22	278502	21166	13	3.5	57.0	2.78	57.7	15	70	12	5
1970	40	386332	29361	14	3.7	53.1	2.38	55.7	20	72	20	6
1971	42	304989	23179	20	3.7	58.0	2.06	58.6	28	92	14	6
1972	42	262792	19972	17	3.2	57.3	2.48	55.3	31	94	16	6
1973	53	249015	18925	9	2.9	55.6	1.92	57.8	31	86	28	7
1974	21	188594	14333	14	4.5	72.2	2.32	76.7	41	89	9	7
1975	31	213475	16224	24	3.6	71.9	1.94	71.3	57	96	14	6
1976	26	66737	5072	10	2.9	70.8	1.98	71.8	51	88	18	8
1977	34	77382	5881	15	2.9	68.5	2.09	71.9	53	93	18	6
1978	58	157764	11990	20	2.5	69.8	1.20	70.4	47	87	24	8
1979	36	82224	6249	52	2.9	71.5	1.38	70.0	60	91	17	6
1980	23	79856	6069	31	3.0	67.0	2.29	71.8	52	87	12	6
1981	24	88317	6712	57	0.0	69.7	1.79	69.0	49	84	16	6
1982	15	36303	2759	29	0.0	69.9	1.77	72.4	59	85	7	6
1983	1	2632	200	50	0.0	82.0	0.00	82.0	82	82	1	1
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	5	34211	2600	90	0.0	66.8	1.20	66.7	62	68	2	2
1986	1	44737	3400	74	0.0	64.0	0.00	64.0	64	64	1	1
All	375	4522550	343711	25	3.0	60.8	0.49	61.3	15	96	74	13

Table 182-4. Spawn summary for section 182 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section centered in the Ganges Harbour-Captain Passage vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Ganges.

C. SPAWNING CONSISTENCY OVER TIME: CONSTANT

If pooled among all localities, there has been a nearly constant annual record of spawnings since 1938 except for the year, 1984.

D. MAGNITUDE OF SPAWNINGS: MEDIUM

1. NUMBER OF SPAWN YEARS/50 YEARS = 49/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 48/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 343.7 Km.
4. CUMULATIVE SPAWN AREA = 452.3 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 2 (60.8)
2. MEAN WEIGHTED DATE (DOY) = March 2 (61.3)

F. COMMENTS:

Spawnings in Ganges Harbour tend to be frequent but small with 875 records of spawning in the vicinity of Ganges Harbour made between 1965 and 1982. The mean spawning time (March 2) is one of the earliest on the coast. The annual total spawn deposition has been in decline since the mid-1970's and the spawn deposition in the 1980's represents historical lows. The explanation for this is uncertain. The only roe fisheries in this area were in the early 1970's and the total catch was small compared to other areas.

G. ROE FISHERIES:

1. NUMBER OF SEINE FISHERY YEARS/15 YEARS = 1/15 (1972-86)
2. NUMBER OF GILLNET FISHERY YEARS/15 YEARS = 7/15 (1972-86)
3. MEAN SEINE CATCH/YEAR = N/A
4. MEAN GILLNET CATCH/YEAR = 771 tons

Table 182-5. History of roe fishery catches by gear type in Ganges Harbour.

SECT. 182	SEINE NET ROE FISHERIES				GILLNET ROE FISHERIES			
YEAR	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA	DATE OPEN (D/Mo)	TIME OPEN (hrs)	HAILED CATCH (Tons)	FISHING AREA
1972	05/02-11/03	840	796	all area 18	05/02-11/03	840	497	all area 18
1973	-	-	-	-	01/03-20/03	456	800	Ganges Hbr. & Captain Pass
1974	-	-	-	-	10/02-02/03	480	(3700)	Ganges Hbr. & Captain Pass & sect. 172
1975	-	-	-	-	10/02-18/03	192	830	Ganges Hbr. & Captain Pass
1976	-	-	-	-	01/03-18/03	312	701	Ganges Hbr. & Captain Pass
1977	-	-	-	-	27/02-15/03	288	761	Ganges Hbr. & Captain Pass
1978	-	-	-	-	26/02-06/03	192	1039	Ganges Hbr. & Captain Pass
1979	-	-	-	-	-	-	-	-
1980	-	-	-	-	-	-	-	-
1981	-	-	-	-	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-
1984	-	-	-	-	-	-	-	-
1985	-	-	-	-	-	-	-	-
1986	-	-	-	-	-	-	-	-

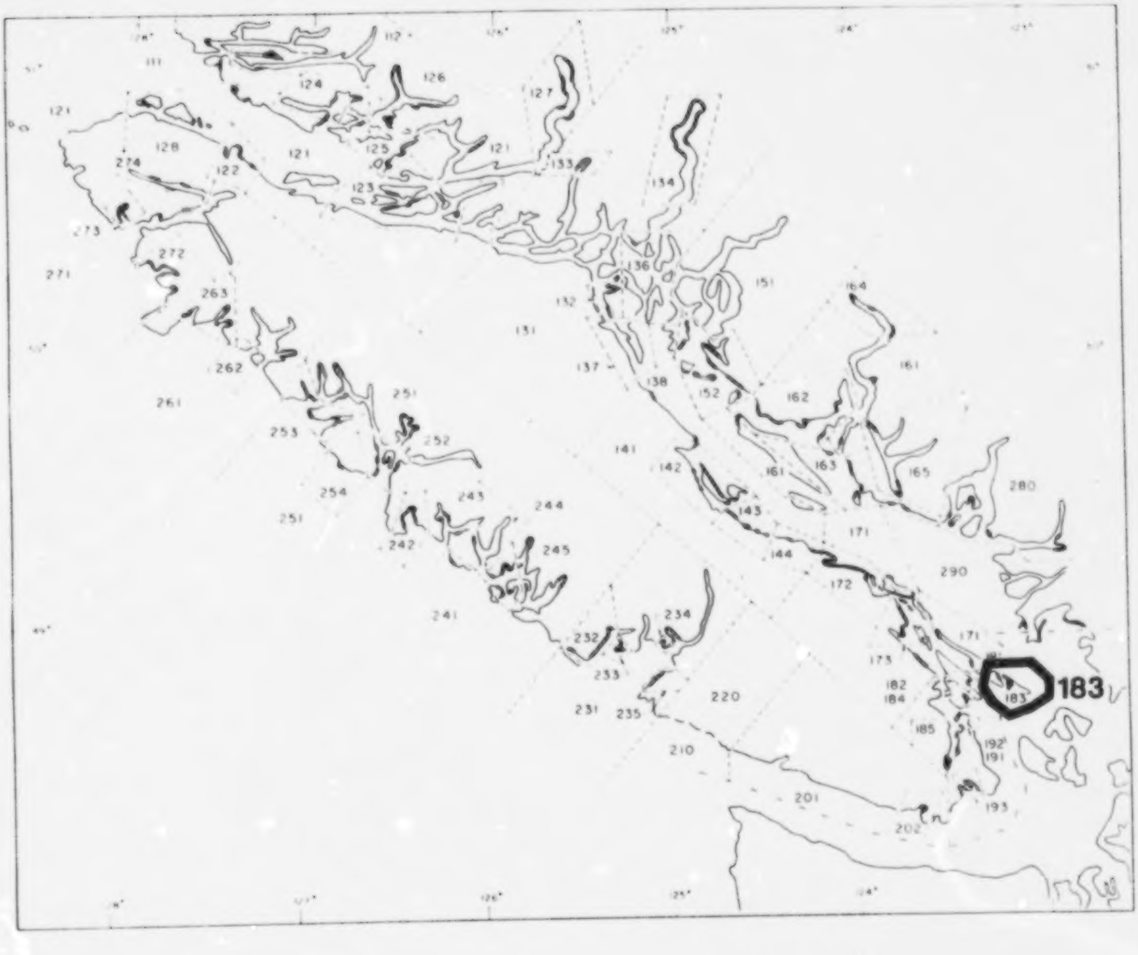

Fig. 183-1. Overview map showing location of section 183, Plumper Sound.

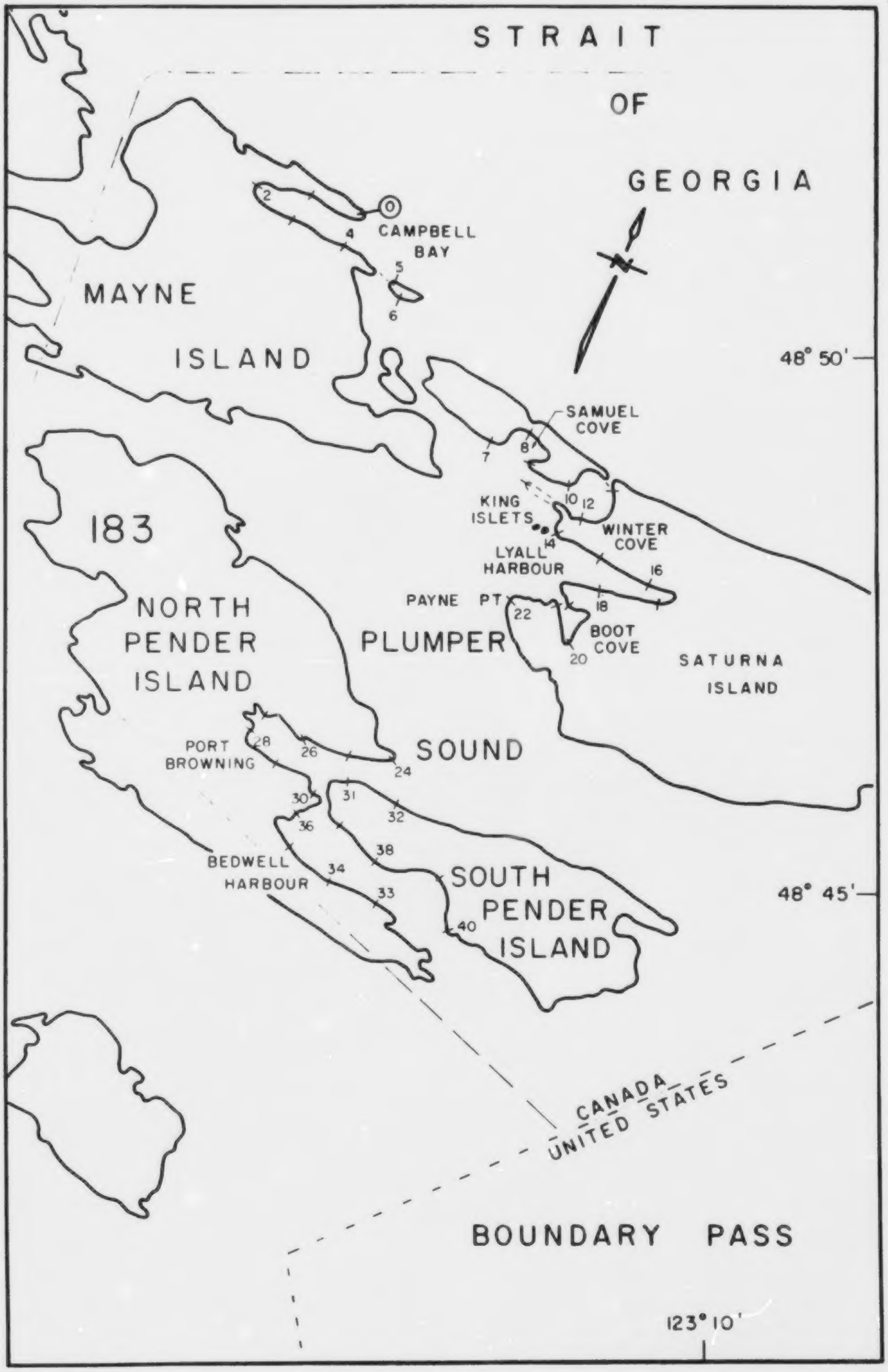

Fig. 183-2. Detailed map of section 183, Plumper Sound.

Table 183-1. Section 183 - Spawn position by year.

```
    0.00     10.00     20.00     30.00
      +----+----+----+----+----+----+----+--
1937 +
1938 +                                  a
1939 +                                  a
1940 +                                  a
1941 +
1942 +
1943 +
1944 +
1945 +
1946 +
1947 +
1948 +
1949 +
1950 +                ^^
1951 +
1952 +  a
1953 +
1954 +
1955 + dd         b             b
1956 + $a       1 a  a$
1957 + 1
1958 +  a                1
1959 +    11                   111        1
1960 +                   1
1961 +                     1
1962 +
1963 +1
1964 +             1     1 11
1965 +              1
1966 + 1              2 23 1
1967 +             21111 1111
1968 + 1           1  12 2111  1
1969 +          1 11111 111
1970 +         1 232211 12 1        1
1971 +          1133222122 31             1
1972 +         2211111111112131           1
1973 +       12211 233221111              1
1974 +  1    1111  211  21 1
1975 +        22 413  2112131
1976 +             21aa  1a
1977 +             2211  12             11
1978 +             2  12 1 3
1979 +               1  12 1
1980 +              1 1 23 1            1
1981 +               1     1
1982 +                  1111
1983 +
1984 +
1985 +
1986 +
      +----+----+----+----+----+----+----+--
    0.00     10.00     20.00     30.00
        C     S   WK L  ~ B P   P        B
        A     A   II Y  S O A   O        E
        M     M   NN A  A O Y   R        D
        P     U   TG L  T T N   T        W
        B     E   E  L  U   E            E
        E     L   RI    R C     B        L
        L          S H  N O P   R        L
        L     C   CL A  A V O   O
              O   OE R    E I   W        H
        B     V   VT B  I   N   N        A
        A     E   ES O  S   T   I        R
        Y            U  L       N        B
              (      R  A       G        O
              I         N                U
              S         D                R
              .
              )
```

Table 183-2. Section 183 - histogram of cumulative spawn frequency over distance

```
                          position(km)
                                0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                            C.00 +*                                                                            1    0    0    1
                            1.00 +****00000                                                                    4    5    0    9
CAMPBELL BAY                2.00 +*0000000                                                                     1    7    0    8
                            3.00 +                                                                             0    0    0    0
                            4.00 +*                                                                            1    0    0    1
                            5.00 +*                                                                            1    0    0    1
                            6.00 +                                                                             0    0    0    0
                            7.00 +**                                                                           2    0    0    2
SAMUEL COVE (IS.)           8.00 +*****                                                                        5    0    0    5
                            9.00 +********                                                                     8    0    0    8
                           10.00 +*******                                                                      7    0    0    7
                           11.00 +*********                                                                    9    0    0    9
WINTER COVE                12.00 +***********000                                                              11    3    0   14
KING ISLETS                13.00 +***********************                                                     23    0    0   23
                           14.00 +****************                                                            16    0    0   16
LYALL HARBOUR              15.00 +*************00                                                             13    2    0   15
                           16.00 +*****************00                                                         17    2    0   19
                           17.00 +*********|                                                                   9    0    1   10
 SATURNA ISLAND            18.00 +****************|                                                           16    0    1   17
                           19.00 +*****************************                                               29    0    0   29
BOOT COVE                  20.00 +*********0                                                                   9    1    0   10
                           21.00 +************************                                                    24    0    0   24
PAYNE POINT                22.00 +*****                                                                        5    0    0    5
                           23.00 +                                                                             0    0    0    0
                           24.00 +                                                                             0    0    0    0
                           25.00 +**                                                                           2    0    0    2
PORT BROWNING              26.00 +*00                                                                          1    2    0    3
                           27.00 +*                                                                            1    0    0    1
                           28.00 +                                                                             0    0    0    0
                           29.00 +                                                                             0    0    0    0
                           30.00 +*                                                                            1    0    0    1
                           31.00 +                                                                             0    0    0    0
                           32.00 +                                                                             0    0    0    0
                                +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 183-2 (cont'd.)

```
                             position(km)
                                    +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                    0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                              33.00 +                                                                             0    0    0    0
                              34.00 +**                                                                           2    0    0    2
BEDWELL HARBOUR               35.00 +*000                                                                         1    3    0    4
                              36.00 +****                                                                         4    0    0    4
                              37.00 +                                                                             0    0    0    0
                              38.00 +                                                                             0    0    0    0
                                    +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                    0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 183-3. Herring statistical spawn summary for section 183.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	1	934	91	0	3.0	38.0	0.00	38.0	38	38	1	1
1939	1	934	91	0	3.0	35.0	0.00	35.0	35	35	1	1
1940	1	934	91	0	1.0	35.0	0.00	35.0	35	35	1	1
1941	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	3	0	0	0	3.0	72.3	10.04	0.0	59	92	3	2
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	1	2350	229	64	1.0	67.0	0.00	67.0	67	67	1	1
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	1	472	46	9	1.0	80.0	0.00	80.0	80	80	1	1
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	8	57384	5593	6	1.0	61.4	4.87	65.7	44	90	5	3
1956	6	20633	2011	5	2.7	87.7	3.69	86.3	78	100	4	3
1957	1	934	91	14	1.0	72.0	0.00	72.0	72	72	1	1
1958	2	3745	365	12	1.0	71.0	11.00	65.5	60	82	2	2
1959	4	22982	2240	8	3.5	78.8	0.75	78.2	78	81	2	3
1960	1	1878	183	9	3.0	84.0	0.00	84.0	84	84	1	1
1961	1	1878	183	9	1.0	85.0	0.00	85.0	85	85	1	1
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	1	2811	274	3	3.0	79.0	0.00	79.0	79	79	1	1
1964	3	6556	639	12	1.7	64.0	7.94	68.3	49	76	3	3
1965	1	185	18	3	1.0	56.0	0.00	56.0	56	56	1	1
1966	7	11491	1120	25	2.7	65.4	1.82	64.3	59	70	4	2
1967	7	22038	2148	17	3.6	66.9	4.32	71.2	51	85	6	1
1968	10	14600	1423	7	1.9	66.4	2.97	65.5	55	78	8	5
1969	5	32822	3199	16	1.4	61.4	4.53	63.0	46	69	4	3
1970	10	64720	6308	19	3.3	62.0	4.59	59.7	41	77	7	4
1971	19	62586	6100	23	3.1	60.1	2.17	62.5	46	71	9	4
1972	13	62596	6101	15	2.4	74.5	3.77	64.8	55	87	7	4
1973	18	86297	8411	20	3.1	68.6	2.51	66.9	49	85	11	5
1974	11	38454	3748	22	3.0	65.4	4.64	70.3	43	79	7	5
1975	21	58123	5665	57	3.2	70.1	2.45	73.9	48	88	15	4
1976	5	7408	722	11	1.8	56.2	3.79	58.5	46	68	4	3
1977	9	22972	2239	10	2.2	66.4	5.04	70.5	49	95	9	4
1978	9	10568	1030	26	1.8	63.3	4.58	63.3	50	96	6	3
1979	5	3099	302	21	1.4	74.8	5.62	73.0	58	87	5	2
1980	8	9768	952	20	4.5	77.0	3.82	77.7	54	85	6	3
1981	2	1642	160	25	0.0	71.0	5.00	71.7	66	76	2	2
1982	3	5130	500	27	0.0	84.3	0.33	84.2	84	85	2	1
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	198	638921	62273	21	2.6	67.7	0.95	67.5	35	100	54	10

Table 183-4. Spawn summary for section 183 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section centered in the Plumper Sound vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Lyall Harbour.

C. SPAWNING CONSISTENCY OVER TIME: FREQUENT

There has been one main spawning episode from 1955 to 1982 with intermittent spawnings in other years.

D. MAGNITUDE OF SPAWNINGS: SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS	= 33/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS	= 32/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH	= 62.3 Km.
4. CUMULATIVE SPAWN AREA	= 63.9 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY)	= March 9 (67.7)
2. MEAN WEIGHTED DATE (DOY)	= March 9 (67.5)

F. COMMENTS:

Section 183 is geographically close to 182. Herring spawning here clearly are part of the same stock that spawns in Ganges Harbour (section 182). Mean spawn times (March 9), like Ganges Harbour, are early. It appears that spawn deposition in section 183 is greatest when it is also high in 182, as if the spawning herring 'spill over' into this adjacent area. It is noteworthy that no spawning has been recorded from the north sides of Saturna or Mayne Islands, which face the open Strait of Georgia.

G. ROE FISHERIES:

No major roe fisheries are documented.

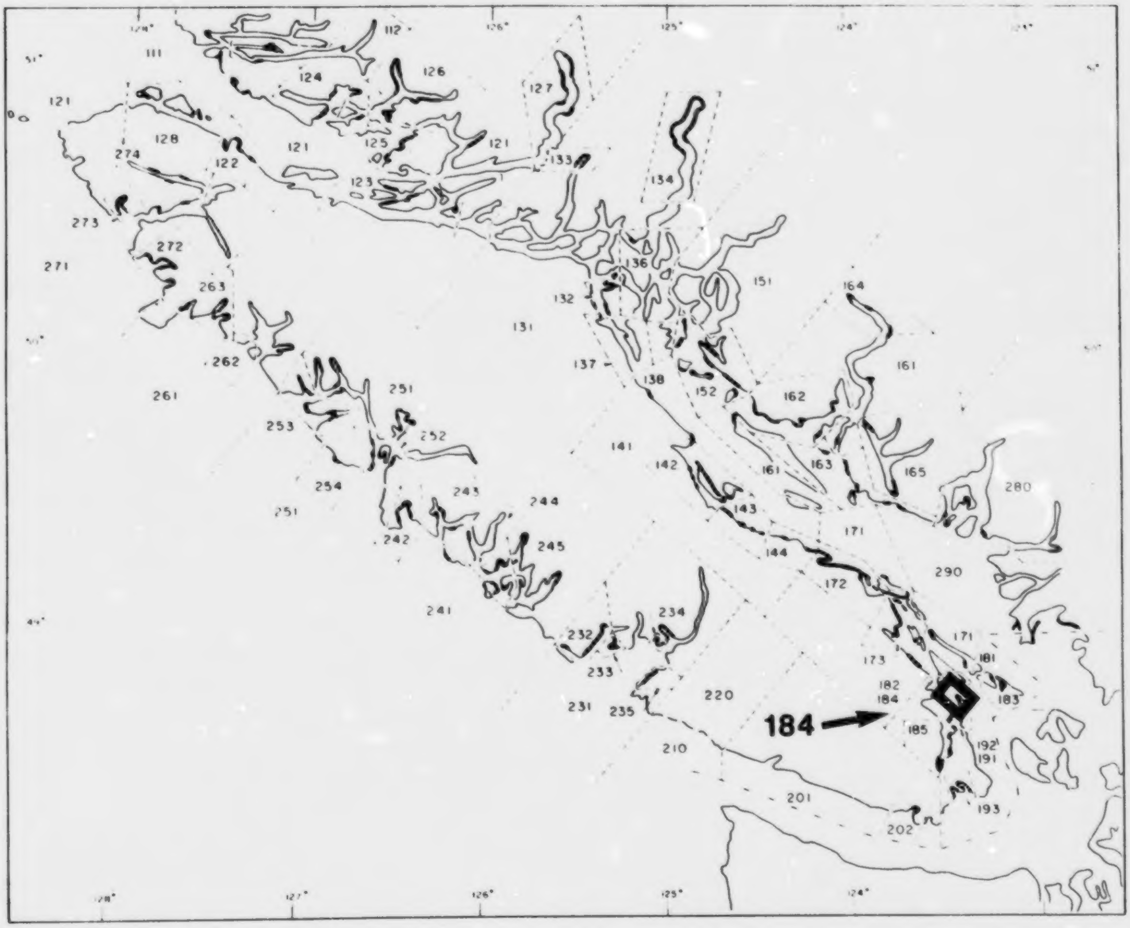

Fig. 184-1. Overview map showing location of section 184, Fulford Harbour.

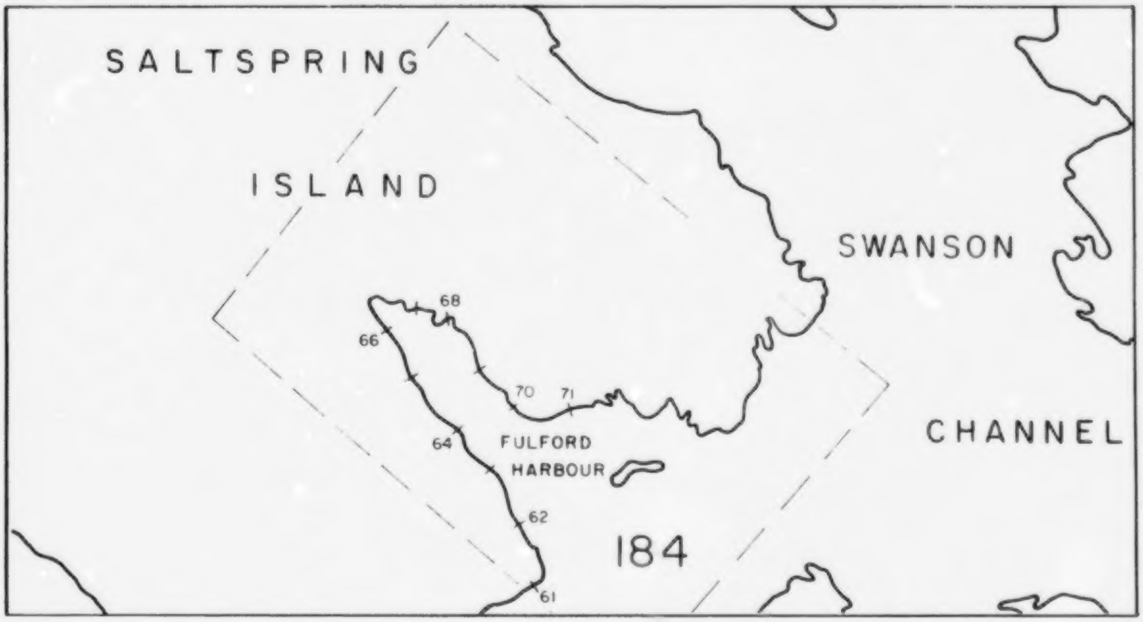

Fig. 184-2. Detailed map of section 184, Fulford Harbour.

Table 184-1. Section 184 - Spawn position by year.

```
    60.00     70.00
      +----+----+-
 1937 +
 1938 +
 1939 +
 1940 +
 1941 +     a
 1942 +
 1943 +
 1944 +
 1945 +
 1946 +
 1947 +
 1948 +
 1949 +
 1950 +
 1951 +
 1952 +     aa
 1953 + 11
 1954 +
 1955 +
 1956 +    1a
 1957 +
 1958 +
 1959 +
 1960 +
 1961 +
 1962 +
 1963 +
 1964 +   11
 1965 +
 1966 +
 1967 +
 1968 +     21
 1969 +
 1970 +   11
 1971 +
 1972 +  111
 1973 +    111   1
 1974 +
 1975 +    1
 1976 +
 1977 +
 1978 +     1   11
 1979 +
 1980 +    1
 1981 +
 1982 +
 1983 +
 1984 +
 1985 +
 1986 +
      +----+----+-
    60.00     70.00
           F
           U
           L
           F
           O
           R
           D

           H
           A
           R
           B
           O
           U
           R
```

Table 184-2. Section 184 - histogram of cumulative spawn frequency over distance

```
                          position(km)
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           59.00 +                                                                               0    0    0    0
                           60.00 +                                                                               0    0    0    0
                           61.00 +*                                                                              1    0    0    1
                           62.00 +**                                                                             2    0    0    2
                           63.00 +***                                                                            3    0    0    3
                           64.00 +*******                                                                        7    0    0    7
FULFORD HARBOUR            65.00 +****000                                                                        4    3    0    7
                           66.00 +**0                                                                            2    1    0    3
                           67.00 +                                                                               0    0    0    0
                           68.00 +                                                                               0    0    0    0
                           69.00 +*                                                                              1    0    0    1
                           70.00 +**                                                                             2    0    0    2
                           71.00 +                                                                               0    0    0    0
                           72.00 +                                                                               0    0    0    0
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 184-3. Herring statistical spawn summary for section 184.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	1	1719	137	0	3.0	44.0	0.00	44.0	44	44	1	1
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	1	10085	804	27	1.0	70.0	0.00	70.0	70	70	1	1
1953	1	11465	914	9	3.0	94.0	0.00	94.0	94	94	1	1
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1956	2	1719	137	8	2.0	75.0	0.00	75.0	75	75	1	1
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1960	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1961	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1964	1	9747	777	18	5.0	72.0	0.00	72.0	72	72	1	1
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	3	10437	832	9	3.0	68.7	13.22	83.5	43	87	3	1
1969	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1970	1	21789	1737	9	3.0	68.0	0.00	68.0	68	68	1	1
1971	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1972	1	29805	2376	14	1.0	88.0	0.00	88.0	88	88	1	1
1973	2	22065	1759	12	1.0	76.5	3.50	74.2	73	80	2	1
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	1	4591	366	91	4.0	71.0	0.00	71.0	71	71	1	1
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	3	13761	1097	52	3.7	79.0	3.21	78.8	73	84	3	1
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	1	1142	91	18	1.0	80.0	0.00	80.0	80	80	1	1
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	18	138323	11027	24	2.6	74.1	3.08	78.1	43	94	14	1

Table 184-4. Spawn summary for section 184 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section centered in the Fulford Harbour vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Fulford Harbour.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There have been intermittent spawnings since 1937.

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 12/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 12/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 11.0 Km.
4. CUMULATIVE SPAWN AREA = 13.8 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 15 (74.1)
2. MEAN WEIGHTED DATE (DOY) = March 19 (78.1)

F. COMMENTS:

This is not a significant herring spawning area. The origin of fish spawning here is uncertain. Probably they are part of the Ganges (section 182) spawning stock but the mean spawning date in some years is quite late.

G. ROE FISHERIES:

No major roe fisheries are documented.

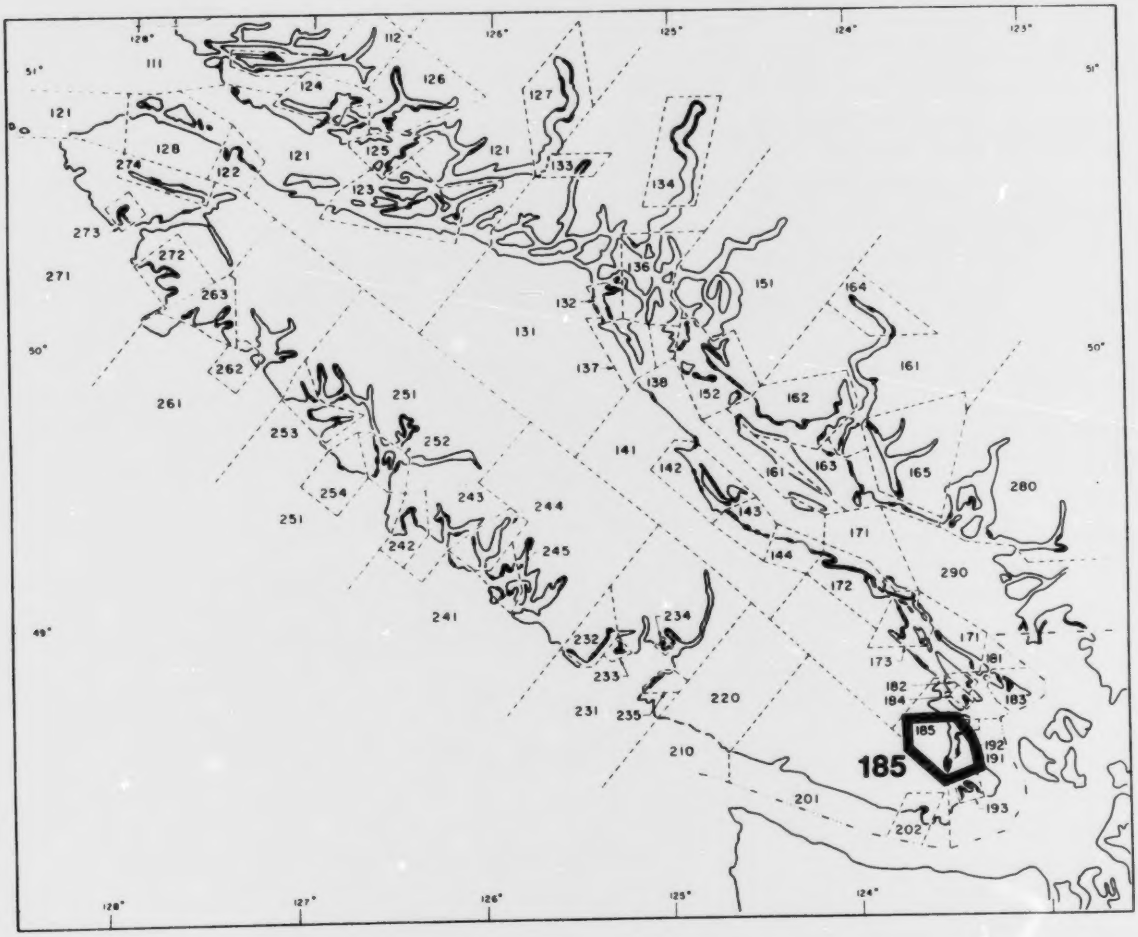

Fig. 185-1. Overview map showing location of section 185, Saanich Harbour.

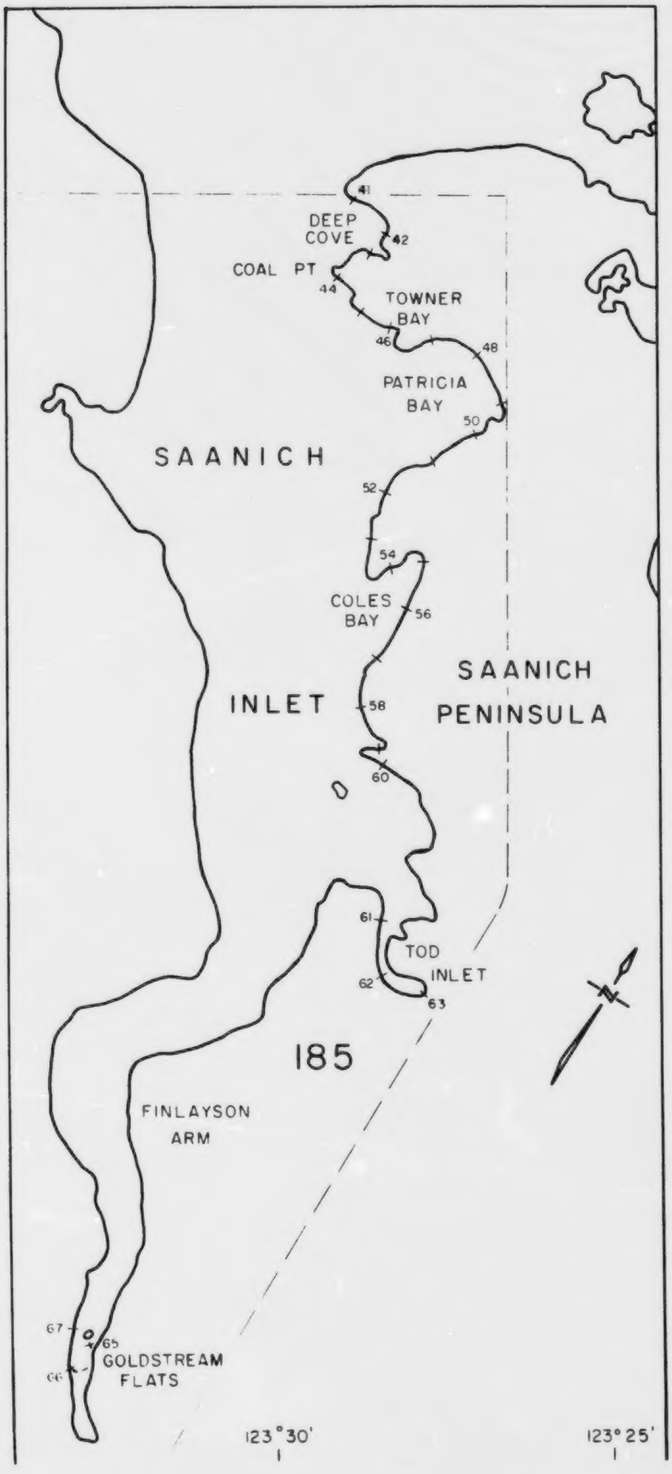

Fig. 185-2. Detailed map of section 185, Saanich Harbour.

```
Table 185-1.  Section 185 - Spawn position by year.
       39.00     49.00     59.00
         +----+----+----+----+----+--
   1937 +                      ^^
   1938 +
   1939 +
   1940 +
   1941 +
   1942 +
   1943 +
   1944 +
   1945 +                         ^^
   1946 +                  ^^     ^^
   1947 +                  ^^
   1948 +               ba ^^
   1949 +                         ^^
   1950 +               a  ^^      a
   1951 +                          2
   1952 +                         ^^
   1953 +
   1954 +
   1955 +                         ^^
   1956 +  b    $$1               ^^
   1957 + 111   111    111        ^^
   1958 +  $  baab11              &&
   1959 +    11221                &&a
   1960 +                         ^^
   1961 +                         ^^
   1962 +       11                ^^
   1963 +      111
   1964 +                         ^^
   1965 +
   1966 +
   1967 +                      ^^
   1968 +                      ^^
   1969 +                      ^^
   1970 +                      ^^
   1971 +                      ^^
   1972 +       aa             ^^
   1973 +
   1974 +
   1975 +
   1976 +
   1977 +
   1978 +
   1979 +
   1980 +
   1981 +
   1982 +
   1983 +
   1984 +
   1985 +
   1986 +

         +----+----+----+----+----+--
       39.00     49.00     59.00_
           D  CT P      C   ~   ~  F
           E  OO A      O   S   T  I
           E  AW T      L   A   O  N
           P  LN R      E   A   D  L
               E I      S   N      A
           C  PR C          I   I  Y
           O  O  I      B   C   N  S
           V  IB A      A   H   L  O
           E  NA        Y       E  N
              TY B          I   T
                 A          N      A
                 Y          L      R
                            E      /
                            T
```

Table 185-2. Section 185 - histogram of cumulative spawn frequency over distance

```
                         position(km)
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           38.00 +                                                                              0    0    0    0
                           39.00 +                                                                              0    0    0    0
                           40.00 +*                                                                             1    0    0    1
DEEP COVE                  41.00 +**000                                                                         2    3    0    5
                           42.00 +*                                                                             1    0    0    1
                           43.00 +*                                                                             1    0    0    1
COAL POINT                 44.00 +*00                                                                           1    2    0    3
TOWNER BAY                 45.00 +***0                                                                          3    1    0    4
                           46.00 +******000                                                                     6    3    0    9
PATRICIA BAY               47.00 +*****0000000                                                                  5    7    0   12
                           48.00 +***                                                                           3    0    0    3
                           49.00 +*                                                                             1    0    0    1
                           50.00 +                                                                              0    0    0    0
                           51.00 +                                                                              0    0    0    0
                           52.00 +                                                                              0    0    0    0
                           53.00 +*                                                                             1    0    0    1
COLES BAY                  54.00 +*000                                                                          1    3    0    4
                           55.00 +*0                                                                            1    1    0    2
                           56.00 +                                                                              0    0    0    0
                           57.00 +IIIII                                                                         0    0    5    5
 SAANICH INLET             58.00 +IIIII                                                                         0    0    5    5
                           59.00 +                                                                              0    0    0    0
                           60.00 +                                                                              0    0    0    0
                           61.00 +IIIIIIIIIIII                                                                  0    0   12   12
 TOD INLET                 62.00 +IIIIIIIIIIII                                                                  0    0   12   12
                           63.00 +                                                                              0    0    0    0
                           64.00 +00IIIIIIIIIIIIIIIIIII                                                         0    2   19   21
FINLAYSON AR/ GOLDSTREAM   65.00 +**000IIIIIIIIIIIIIIIIIII                                                      2    3   19   24
                           66.00 +0                                                                             0    1    0    1
                           67.00 +                                                                              0    0    0    0
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 185-3. Herring statistical spawn summary for section 185.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	3	19177	548	0	5.0	106.3	5.24	111.5	96	113	3	2
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	2	15992	457	115	3.0	85.5	0.50	85.2	85	86	2	1
1946	2	72298	2066	55	3.0	79.0	0.00	79.0	79	79	1	2
1947	1	15992	457	69	5.0	97.0	0.00	97.0	97	97	1	1
1948	4	58545	1673	16	3.5	94.5	2.06	92.6	89	99	3	2
1949	1	11198	320	160	3.0	98.0	0.00	98.0	98	98	1	1
1950	3	11373	325	25	2.3	105.0	0.00	105.0	105	105	1	3
1951	2	12808	366	46	2.5	100.5	9.50	100.5	91	110	2	1
1952	1	2415	69	18	5.0	83.0	0.00	83.0	83	83	1	1
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	1	9588	274	73	3.0	108.0	0.00	108.0	108	108	1	1
1956	11	174445	4985	106	4.8	90.2	3.16	91.2	81	110	5	3
1957	4	177525	5073	18	5.0	85.0	2.92	87.3	77	91	3	4
1958	11	149494	4272	52	2.6	78.2	2.53	77.5	71	97	6	6
1959	7	207934	5942	23	5.0	83.1	4.13	79.4	74	99	4	5
1960	1	19177	548	18	5.0	83.0	0.00	83.0	83	83	1	1
1961	1	9588	274	37	3.0	100.0	0.00	100.0	100	100	1	1
1962	2	35204	1006	7	3.0	93.0	4.00	91.9	89	97	2	2
1963	2	52806	1509	12	2.0	86.5	6.50	82.0	80	93	2	2
1964	1	2240	64	64	3.0	96.0	0.00	96.0	96	96	1	1
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	1	12808	366	11	5.0	76.0	0.00	76.0	76	76	1	1
1968	2	31985	914	11	7.0	79.0	5.00	77.0	74	84	2	1
1969	1	22396	640	12	9.0	81.0	0.00	81.0	81	81	1	1
1970	2	23971	685	9	7.0	73.5	3.50	75.6	70	77	2	1
1971	2	35169	1005	18	4.0	68.5	11.50	69.5	57	80	2	1
1972	3	43987	1257	42	5.0	72.0	0.00	72.0	72	72	1	2
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	71	1228115	35095	48	4.1	86.7	1.45	84.3	57	113	30	9

Table 185-4. Spawn summary for section 185 from 1937 to 1986.

A. GENERAL:

There are two main spawning areas in this section of Saanich Inlet:

(i) Pat Bay-Tod Inlet and
(ii) Goldstream Flats

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Pat Bay and Victoria.

C. SPAWNING CONSISTENCY OVER TIME: FREQUENT

There have been three main spawning episodes, 1945-52, 1955-64 and 1967-72.

D. MAGNITUDE OF SPAWNINGS: SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 25/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 25/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 35.1 Km.
4. CUMULATIVE SPAWN AREA = 122.8 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 28 (86.7)
2. MEAN WEIGHTED DATE (DOY) = March 25 (84.3)

F. COMMENTS:

Saanich Inlet has 78 discontinuous records with a relatively late time of March 28. Spawn appearances occur in 'pulses' of five to six continuous years separated by periods of no spawning (i.e., 1931 to 1937; 1945 to 1952; 1955 to 1964; 1967 to 1971). No spawns have been recorded since 1972. This area may be an example of an ephameral or 'transitory' stock, which colonized the area but gradually declined in subsequent years.

G. ROE FISHERIES:

No major roe fisheries are documented.

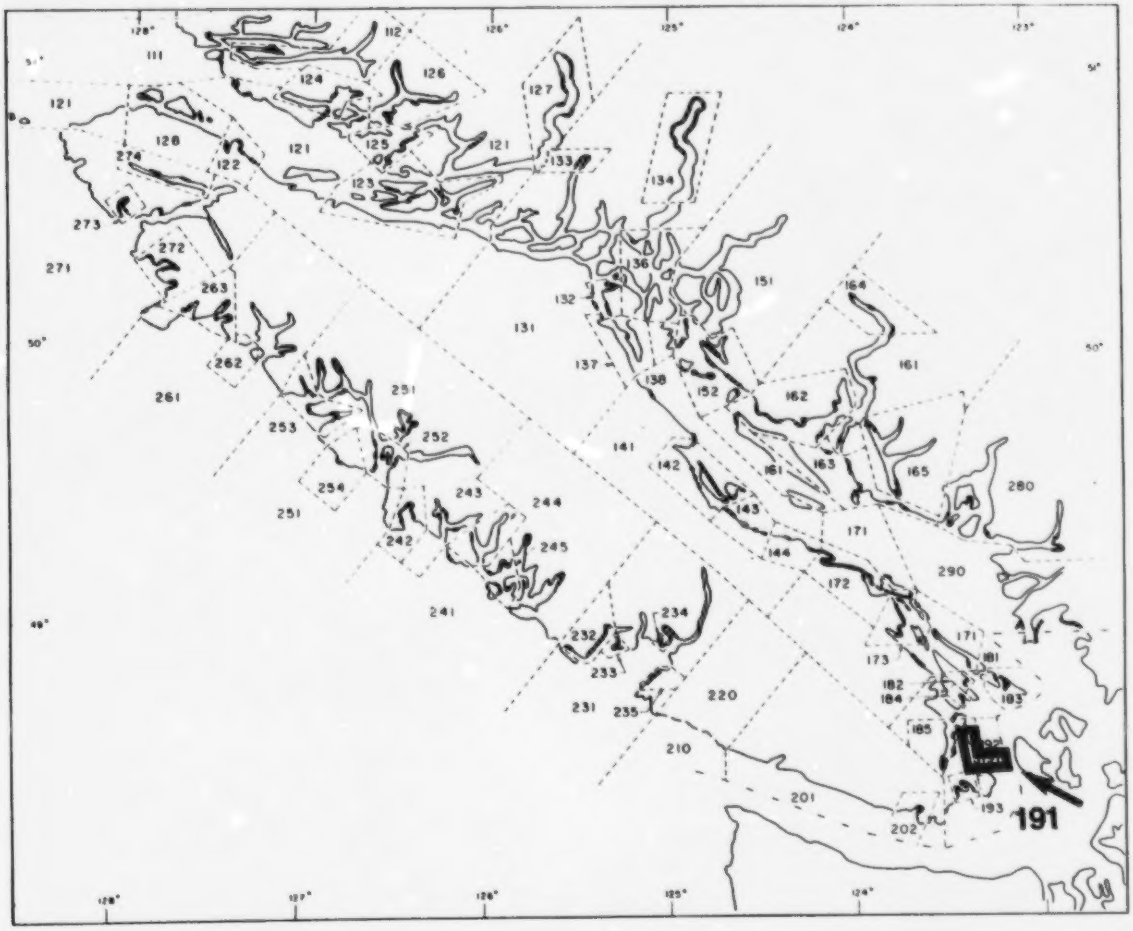

Fig. 191-1. Overview map showing location of section 191, Other Area 19.

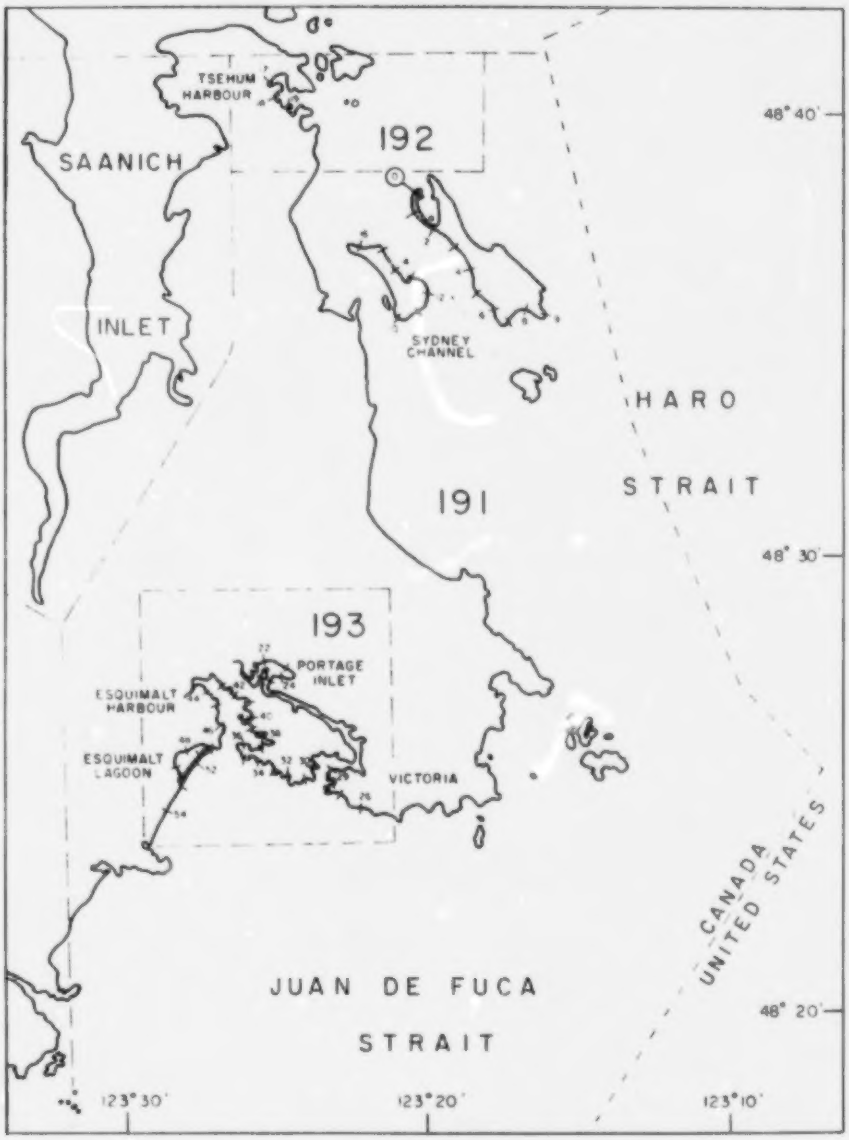

Fig. 191-2. Detailed map of section 191, Other Area 19.

Table 191-4. Spawn summary for section 191 from 1937 to 1986.

A. GENERAL:

There is one spawning area in Sidney Channel.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Sidney and Victoria.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

Only one record of spawning has been made for section 191, in Sidney Channel, April 14, 1932.

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = N/A (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = N/A (1937-86)
3. CUMULATIVE SPAWN LENGTH = N/A Km.
4. CUMULATIVE SPAWN AREA = N/A ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = N/A
2. MEAN WEIGHTED DATE (DOY) = N/A

F. COMMENTS:

Section 191 is not a significant herring spawning area.

G. ROE FISHERIES:

No major roe fisheries are documented.

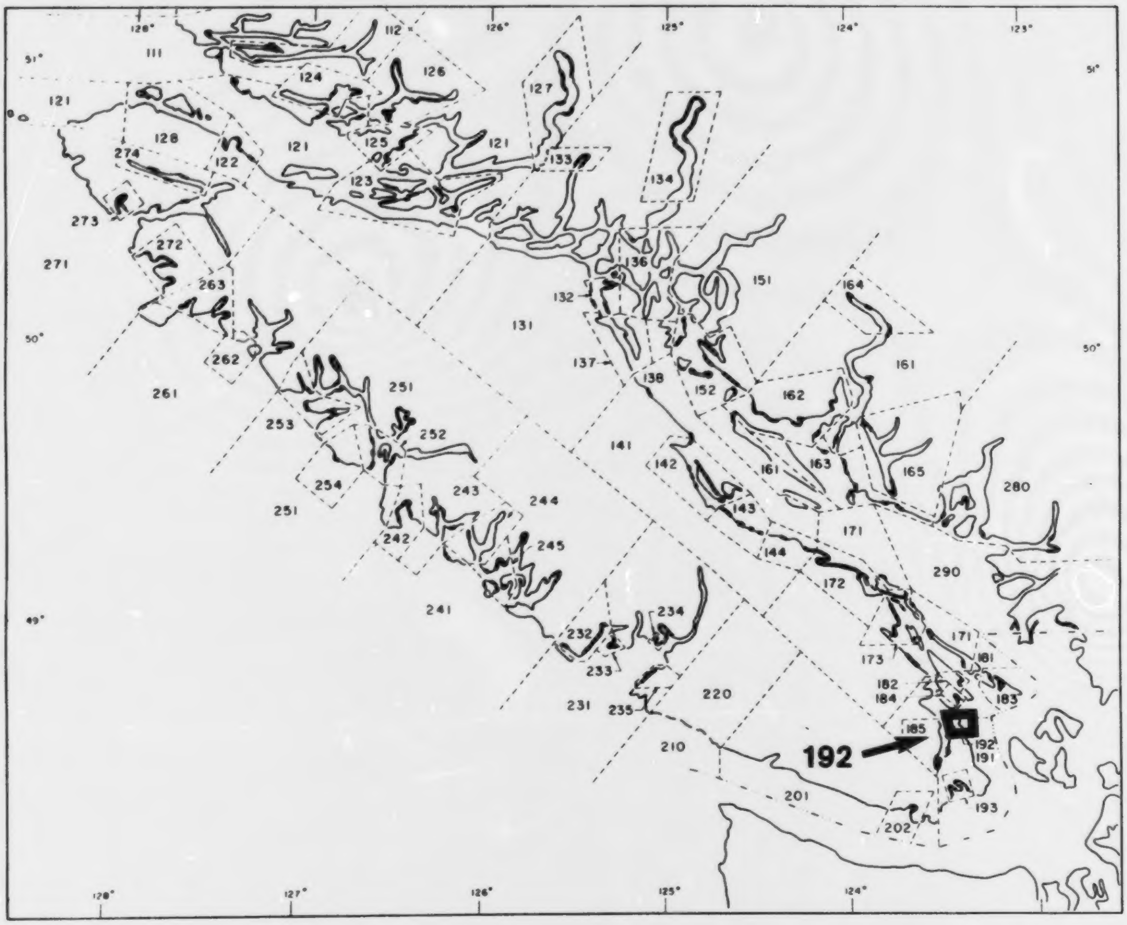

Fig. 192-1. Overview map showing location of section 192, Tsehum Harbour.

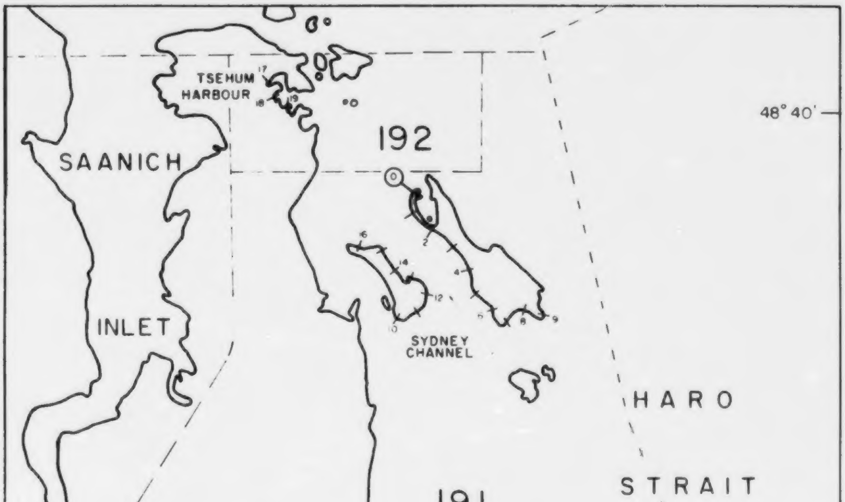

Fig. 192-2. Detailed map of section 192, Tsehum Harbour.

Table 192-2. Section 192 - histogram of cumulative spawn frequency over distance

```
                        position(km)
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           16.00 +                                                                             0    0    0    0
                           17.00 +|||                                                                          0    0    3    3
  TSEHUM HARBOUR           18.00 +|||                                                                          0    0    3    3
                           19.00 +                                                                             0    0    0    0
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 192-3. Herring statistical spawn summary for section 192.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1960	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1961	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1964	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1969	1	134	91	9	1.0	89.0	0.00	89.0	89	89	1	1
1970	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1971	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1972	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1973	1	68	46	9	1.0	87.0	0.00	87.0	87	87	1	1
1974	1	134	91	9	3.0	69.0	0.00	69.0	69	69	1	1
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	3	335	228	9	1.7	81.7	6.36	80.6	69	89	3	1

Table 192-4. Spawn summary for section 192 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section near Sidney centered in the Tsehum Harbour vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Sidney and Victoria.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There have been only three recorded spawnings, 1969, 1973 and 1974, but others have occurred.

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 3/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 3/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 0.2 Km.
4. CUMULATIVE SPAWN AREA = 0.03 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 23 (81.7)
2. MEAN WEIGHTED DATE (DOY) = March 22 (80.6)

F. COMMENTS:

Section 192 is not a significant herring spawning area.

G. ROE FISHERIES:

No major roe fisheries are documented.

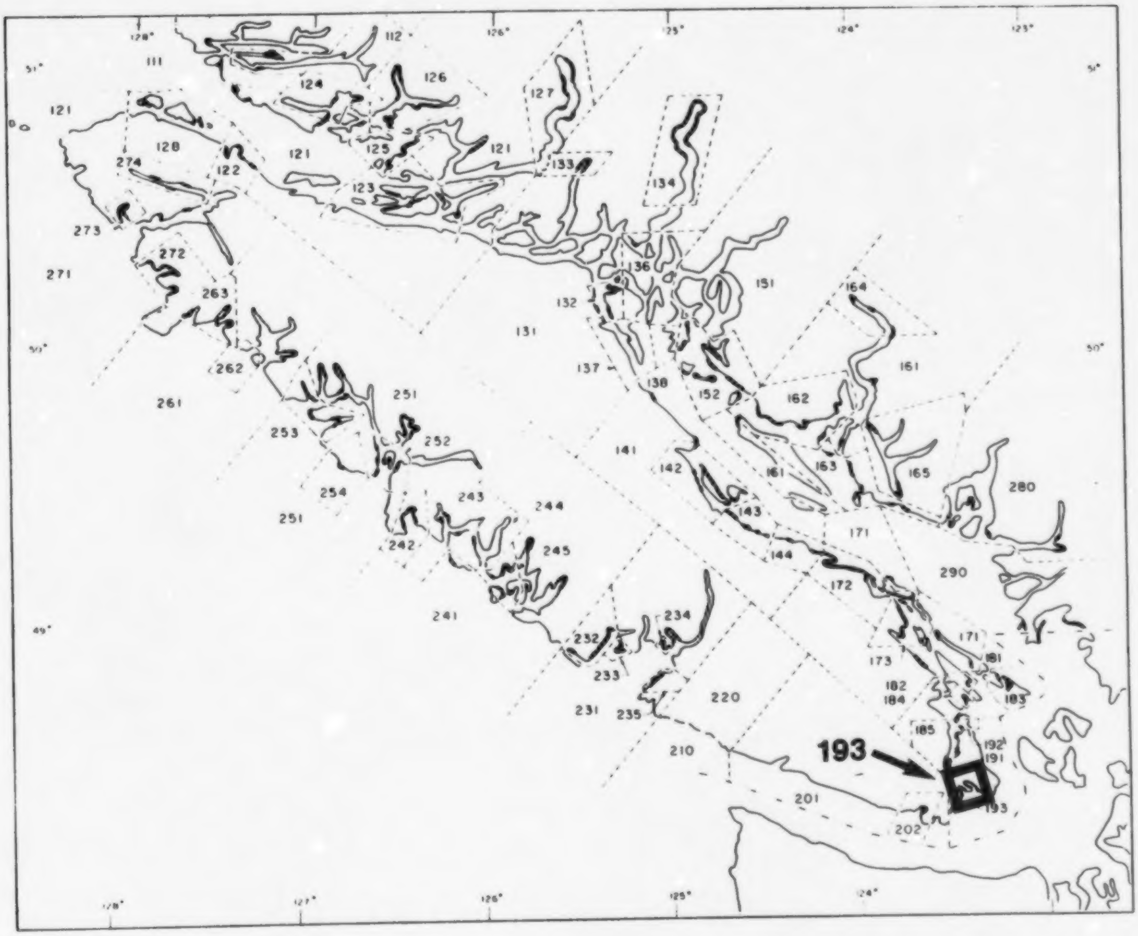

Fig. 193-1. Overview map showing location of section 193, Victoria Harbour.

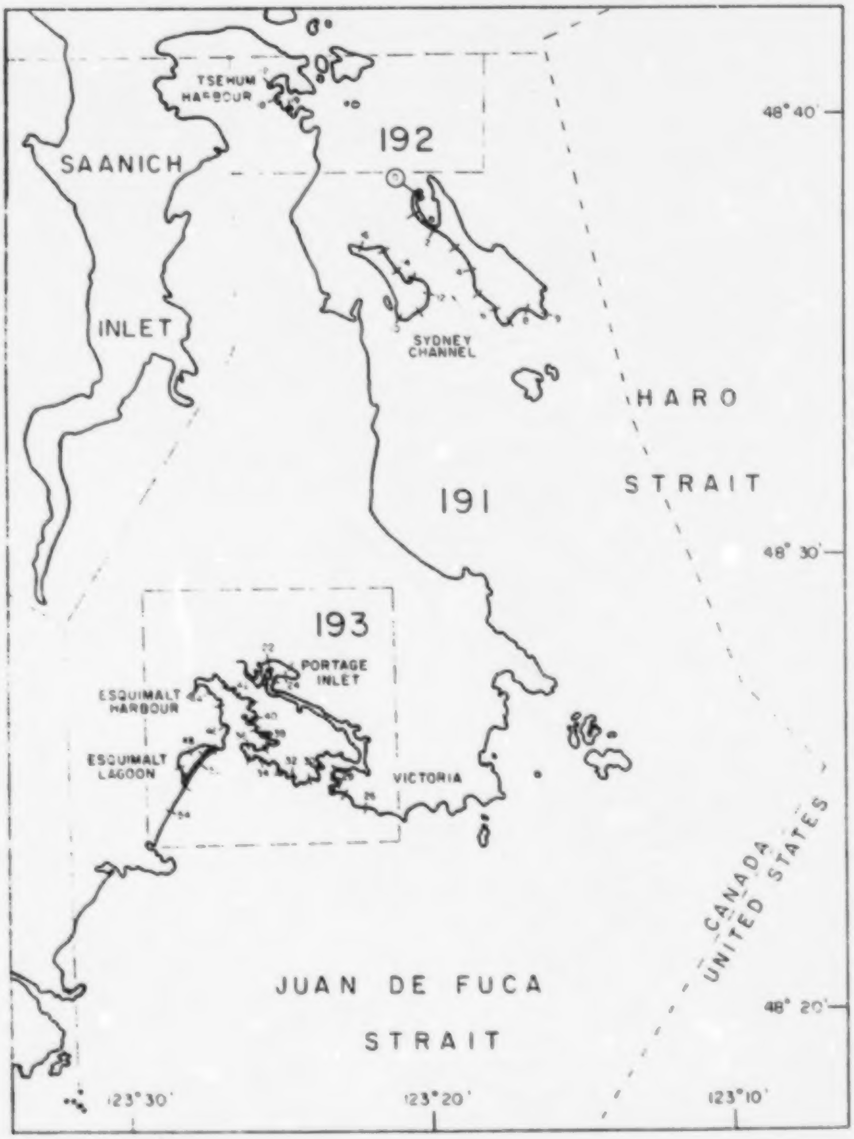

Fig. 193-2. Detailed map of section 193, Victoria Harbour.

Table 193-3. Herring statistical spawn summary for section 193.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	2	3159	676	0	5.0	67.0	7.00	65.7	60	74	2	2
1938	2	3159	676	0	5.0	57.5	11.50	55.3	46	69	2	2
1939	3	4014	859	0	4.3	77.0	4.36	75.7	69	84	3	3
1940	2	3159	676	0	5.0	68.5	3.50	67.8	65	72	2	2
1941	3	4014	859	0	3.7	71.3	3.67	69.9	64	75	2	3
1942	1	425	91	23	5.0	60.0	0.00	60.0	60	60	1	1
1943	1	425	91	23	5.0	60.0	0.00	60.0	60	60	1	1
1944	1	425	91	23	3.0	61.0	0.00	61.0	61	61	1	1
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	2	215	46	23	2.0	87.0	13.00	100.0	74	100	2	2
1947	4	748	160	15	3.0	69.8	5.20	66.6	58	79	4	3
1948	3	537	115	21	1.0	78.7	2.96	75.8	73	83	3	3
1949	3	678	145	18	1.0	78.0	5.57	76.2	71	89	3	3
1950	3	766	164	27	1.0	86.0	1.00	84.5	84	87	2	3
1951	2	766	164	27	1.0	93.0	17.00	104.4	76	110	2	2
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1959	2	3416	731	14	1.0	97.5	0.50	97.3	97	98	2	1
1960	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1961	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1962	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1963	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1964	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1965	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1966	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1967	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1968	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1969	1	855	183	18	1.0	79.0	0.00	79.0	79	79	1	1
1970	1	215	46	9	1.0	73.0	0.00	73.0	73	73	1	1
1971	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1972	1	1070	229	14	1.0	75.0	0.00	75.0	75	75	1	1
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	37	28047	6002	20	2.7	75.7	2.14	73.5	46	110	24	4

Table 193-4. Spawn summary for section 193 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this Victoria section centered in the Portage Inlet-Esquimalt Harbour vicinity.

B. COMPLETENESS OF RECORDS:

In view of the urban developments around Esquimalt Harbour, it is unlikely that many large spawnings would have been unreported.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There have been small, constant spawnings from 1937 to 1951, intermittent spawnings to 1972 and no recorded spawns since 1972, although spawnings are known to have occurred there.

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 18/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 18/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 6.0 Km.
4. CUMULATIVE SPAWN AREA = 2.8 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 17 (75.7)
2. MEAN WEIGHTED DATE (DOY) = March 15 (73.5)

F. COMMENTS:

This section of Esquimalt Harbour has 37 records. There has been considerable interest in the herring spawning 'run' in Portage Inlet by local sports fishermen. It is noteworthy that spawning activity was regular between 1937 and 1952.

G. ROE FISHERIES:

No major roe fisheries are documented.

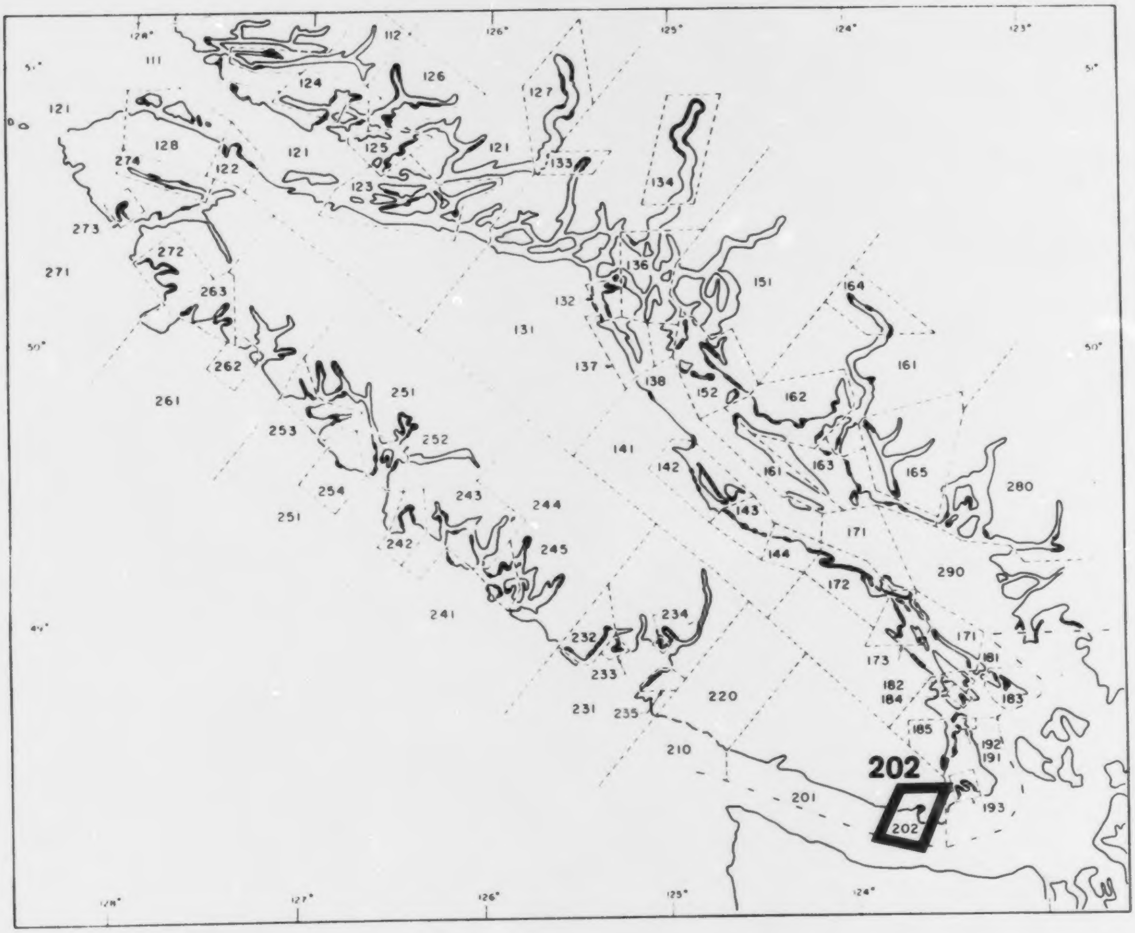

Fig. 202-1. Overview map showing location of section 202, Sooke Inlet.

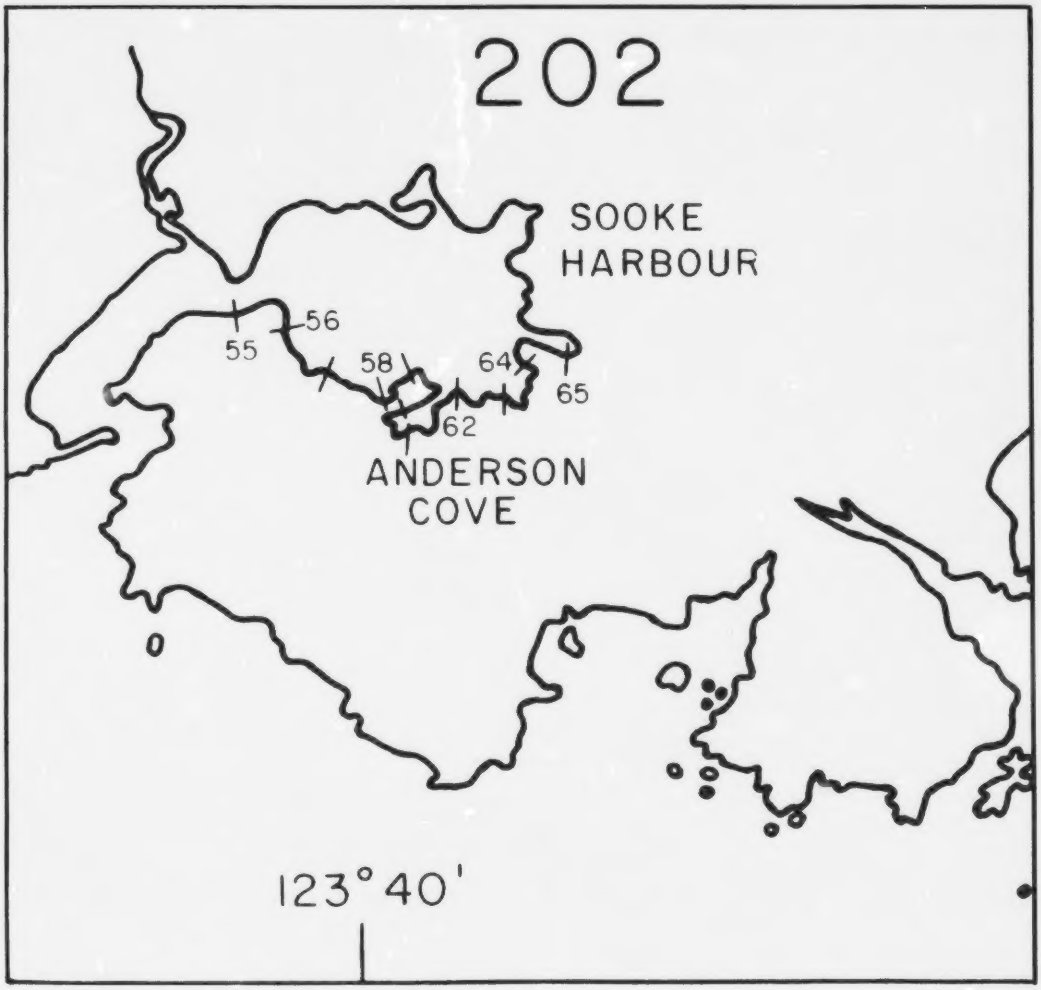

Fig. 202-2. Detailed map of section 202, Sooke Inlet.

Table 202-1. Section 202 - Spawn position by year.

```
    56.00
      +----+--
1937 +
1938 +
1939 +
1940 +
1941 +
1942 +
1943 +
1944 +
1945 +
1946 +
1947 +
1948 +
1949 +
1950 +
1951 +bb
1952 +
1953 +
1954 +
1955 +
1956 +
1957 +
1958 +
1959 +
1960 +
1961 +     aa
1962 +
1963 +
1964 +     aa
1965 +
1966 +
1967 +
1968 +
1969 +      1
1970 + 1   1
1971 +
1972 +
1973 +
1974 +
1975 +
1976 +
1977 +
1978 +
1979 +
1980 +
1981 +
1982 +
1983 +
1984 +
1985 +
1986 +

      +----+--
    56.00
       S   A
       O   N
       O   D
       K   E
       E   R
           S
       H   O
       A   N
       R
       B   C
       O   O
       U   V
       R   E
```

Table 202-2. Section 202 - histogram of cumulative spawn frequency over distance

```
                          position(km)
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                           55.00 +                                                                              0    0    0    0
                           56.00 +00                                                                            0    2    0    2
SOOKE HARBOUR              57.00 +*00                                                                           1    2    0    3
                           58.00 +                                                                              0    0    0    0
                           59.00 +                                                                              0    0    0    0
                           60.00 +                                                                              0    0    0    0
ANDERSON COVE              61.00 +*00                                                                           1    2    0    3
                           62.00 +*00                                                                           1    2    0    3
                           63.00 +                                                                              0    0    0    0
                           64.00 +                                                                              0    0    0    0
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 202-4. Spawn summary for section 202 from 1937 to 1986.

A. GENERAL:

The only recorded spawnings have been in Sooke Harbour.

B. COMPLETENESS OF RECORDS:

In view of the urban developments around Sooke Harbour, it is unlikely that many large spawnings would have been unreported.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There are only seven records made from five years: 1951, 1961, 1964, 1969 and 1970.

D. MAGNITUDE OF SPAWNINGS: VERY SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 7/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 7/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 1.6 Km.
4. CUMULATIVE SPAWN AREA = N/A ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = April 6 (96.0)
2. MEAN WEIGHTED DATE (DOY) = N/A

F. COMMENTS:

G. ROE FISHERIES:

No major roe fisheries are documented.

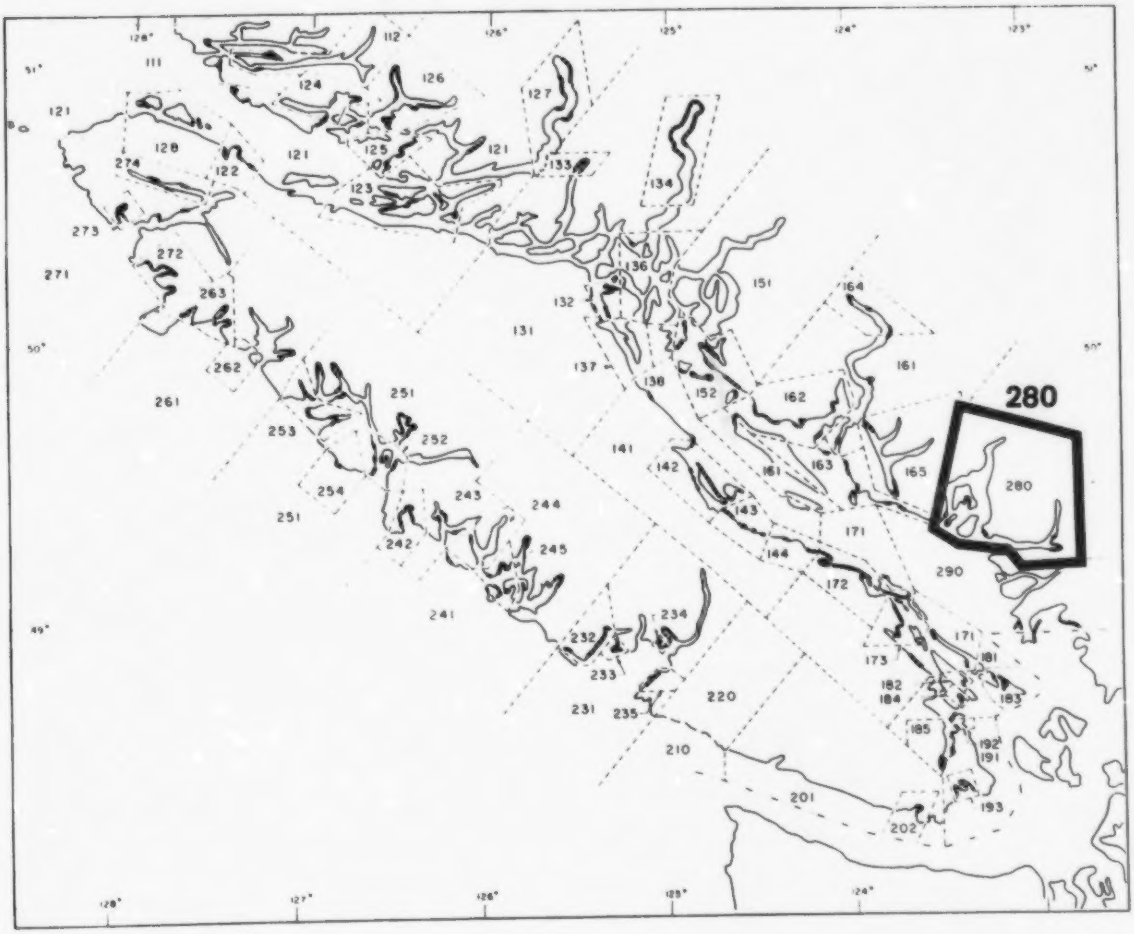

Fig. 280-1. Overview map showing location of section 280, Howe Sound.

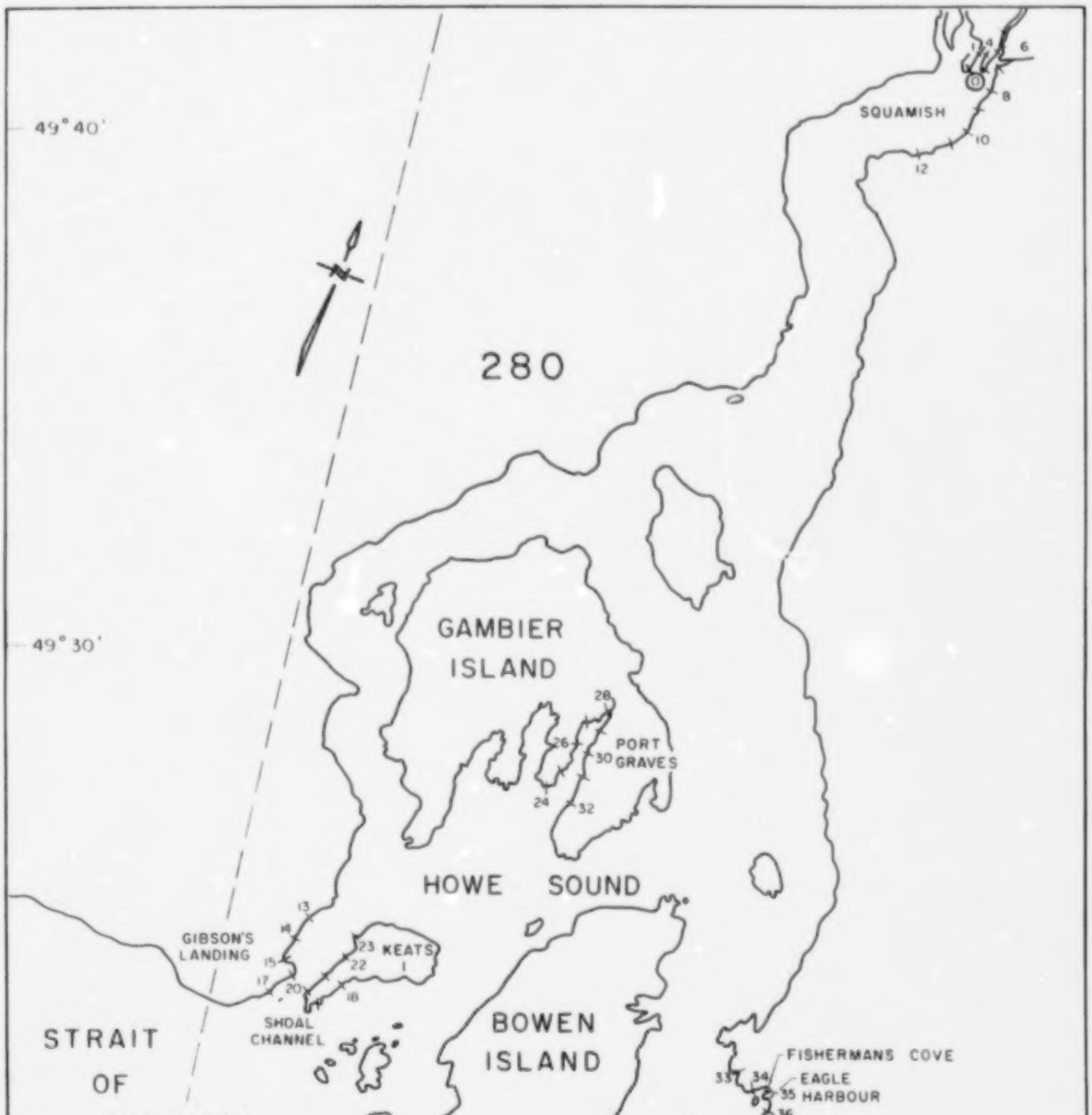

Fig. 280-2. Detailed map of section 280. Howe Sound.

Table 280-2. Section 280 - histogram of cumulative spawn frequency over distance

```
                         position(km)
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
SQUAMISH                    0.00 +IIIIIIIIIII                                                                   0    0   11   11
                            1.00 +IIII                                                                          0    0    4    4
                            2.00 +III                                                                           0    0    3    3
                            3.00 +I                                                                             0    0    1    1
                            4.00 +                                                                              0    0    0    0
                            5.00 +                                                                              0    0    0    0
                            6.00 +                                                                              0    0    0    0
                            7.00 +                                                                              0    0    0    0
                            8.00 +                                                                              0    0    0    0
                            9.00 +                                                                              0    0    0    0
                           10.00 +                                                                              0    0    0    0
                           11.00 +                                                                              0    0    0    0
                           12.00 +                                                                              0    0    0    0
                           13.00 +                                                                              0    0    0    0
                           14.00 +                                                                              0    0    0    0
                           15.00 +                                                                              0    0    0    0
                           16.00 +I                                                                             0    0    1    1
GIBSONS LANDING            17.00 +IIIIII                                                                        0    0    6    6
KEATS ISLAND               18.00 +IIIII                                                                         0    0    5    5
                           19.00 +                                                                              0    0    0    0
                           20.00 +IIIII                                                                         0    0    5    5
SHOAL CHANNEL              21.00 +IIIII                                                                         0    0    5    5
                           22.00 +                                                                              0    0    0    0
                           23.00 +                                                                              0    0    0    0
                           24.00 +                                                                              0    0    0    0
                           25.00 +                                                                              0    0    0    0
                           26.00 +                                                                              0    0    0    0
                           27.00 +                                                                              0    0    0    0
                           28.00 +III                                                                           0    0    3    3
PORT GRAVES                29.00 +III                                                                           0    0    3    3
                           30.00 +                                                                              0    0    0    0
                           31.00 +                                                                              0    0    0    0
                           32.00 +                                                                              0    0    0    0
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
```

Table 280-2 (cont'd)

```
                          position(km)
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                          33.00 +                                                                               0    0    0    0
                          34.00 +                                                                               0    0    0    0
                          35.00 +I                                                                              0    0    1    1
EAGLE HARBOUR             36.00 +I                                                                              0    0    1    1
                          37.00 +                                                                               0    0    0    0
                                 +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                                 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varh varc  all
```

Table 280-3. Herring statistical spawn summary for section 280.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	2	19423	1142	21	4.5	104.0	3.00	104.8	101	107	2	1
1955	2	30308	1782	28	6.0	94.5	0.50	94.5	94	95	2	1
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1958	1	94581	5561	5	3.0	96.0	0.00	96.0	96	96	1	1
1959	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1960	2	77727	4570	2	3.0	81.0	11.00	74.4	70	92	2	2
1961	1	60634	3565	6	6.0	79.0	0.00	79.0	79	79	1	1
1962	6	102218	6010	3	6.3	75.0	1.39	75.9	70	79	5	3
1963	5	79274	4661	9	5.8	74.0	1.45	74.8	70	77	4	4
1964	8	108035	6352	22	5.3	76.3	0.70	75.8	73	78	3	5
1965	6	44782	2633	8	5.8	87.2	6.73	80.3	71	108	5	5
1966	2	3895	229	12	3.0	75.5	5.50	78.8	70	81	2	2
1967	1	7773	457	23	1.0	92.0	0.00	92.0	92	92	1	1
1968	3	22485	1322	14	3.0	74.3	0.67	74.9	73	75	2	3
1969	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1970	2	17093	1005	10	2.5	78.0	3.00	79.4	75	81	2	2
1971	4	21991	1293	15	5.3	85.5	7.40	78.9	69	105	3	4
1972	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1973	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1974	1	12433	731	14	5.0	102.0	0.00	102.0	102	102	1	1
1975	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1976	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1977	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1978	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	46	702652	41313	13	4.9	81.6	1.68	81.3	69	108	21	11

Table 280-4. Spawn summary for section 280 from 1937 to 1986.

A. GENERAL:

There are four main spawning areas in this Howe Sound section:

(i) Squamish
(ii) Gibson's Landing
(iii) Port Graves and
(iv) Eagle Harbour

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Squamish, Gibson's Landing and Horseshoe Bay.

C. SPAWNING CONSISTENCY OVER TIME: INFREQUENT

There have been intermittent spawnings from 1954 to 1974 with no recorded spawns in other years.

D. MAGNITUDE OF SPAWNINGS: SMALL

1. NUMBER OF SPAWN YEARS/50 YEARS = 15/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 15/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 41.3 Km.
4. CUMULATIVE SPAWN AREA = 70.3 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 23 (81.6)
2. MEAN WEIGHTED DATE (DOY) = March 22 (81.3)

F. COMMENTS:

This area has only 49 records with a mean spawning time of March 23, a time similar to those of adjacent areas to the north but sharply different than those to the south in Boundary Bay. Spawns were continuous in this area from 1960 to 1968 but no spawns records occur prior to 1954 (except for three in 1934) or since 1974. Most of the spawning has occurred in the vicinity of Gambier Island and Gibson's Landing. The first records of herring spawning in Squamish were in 1958. The fishery officer records of those spawnings indicated that this was an unusual event in Squamish - neither the fishery officer or long-time residents of Squamish had observed, seen or heard of this before.

G. ROE FISHERIES:

No major roe fisheries are documented.

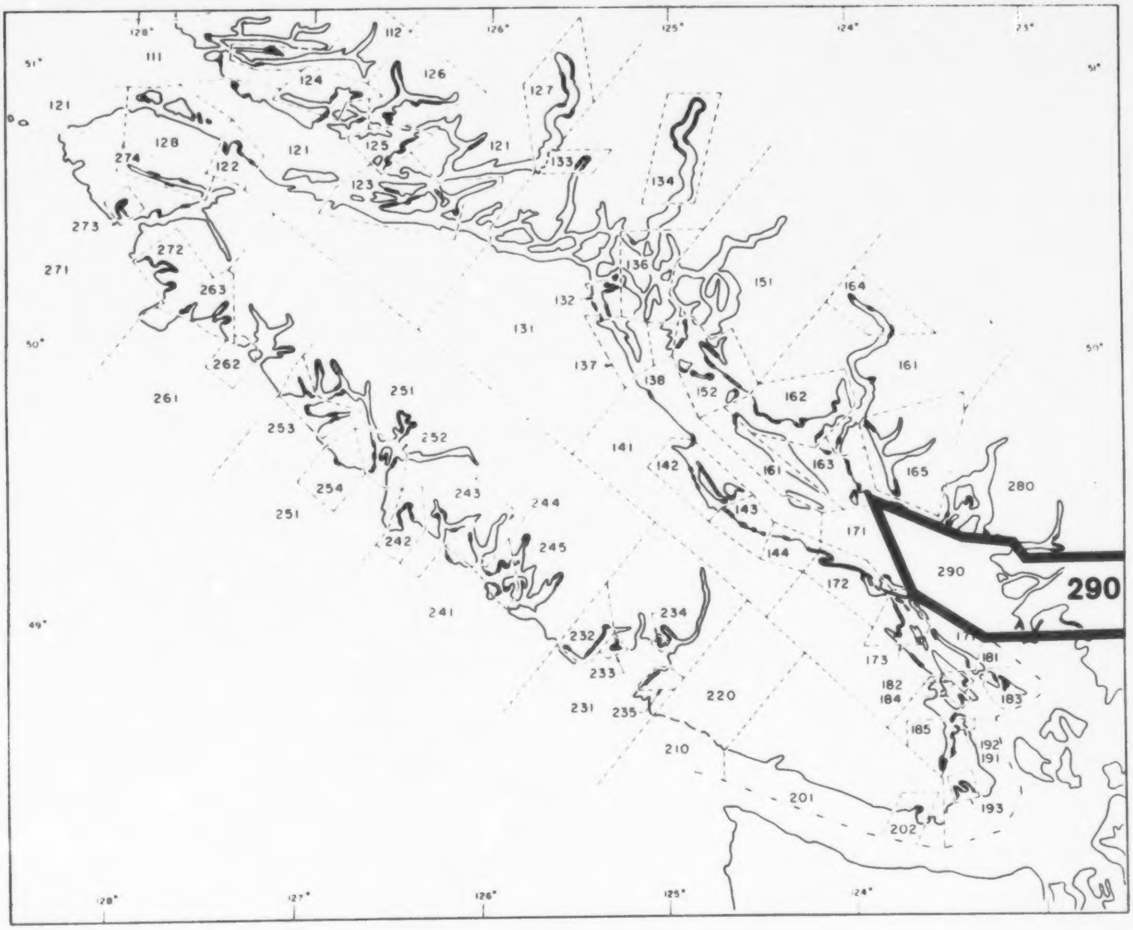

Fig. 290-1. Overview map showing location of section 290, Boundary Bay.

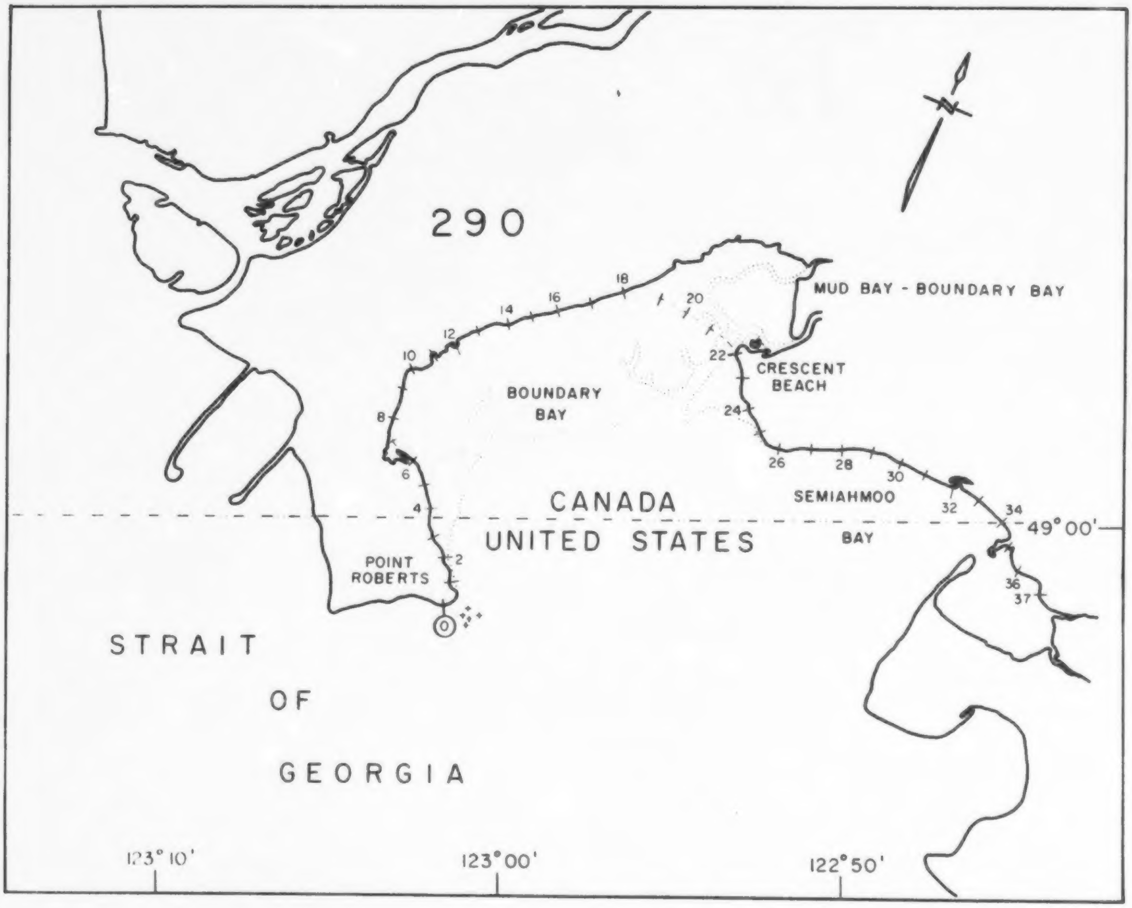

Fig. 290-2. Detailed map of section 290, Boundary Bay.

Table 290-2. Section 290 - histogram of cumulative spawn frequency over distance

```
                        position(km)
                                   0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
                                   +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
POINT ROBERTS                 0.00 +IIIII                                                                         0    0    5    5
                              1.00 +II                                                                            0    0    2    2
                              2.00 +                                                                              0    0    0    0
                              3.00 +I                                                                             0    0    1    1
BOUNDARY B-RNG MRKR(W SI      4.00 +I                                                                             0    0    1    1
                              5.00 +                                                                              0    0    0    0
                              6.00 +                                                                              0    0    0    0
                              7.00 +                                                                              0    0    0    0
                              8.00 +IIII                                                                          0    0    4    4
                              9.00 +IIII                                                                          0    0    4    4
                             10.00 +IIIIIIIIIII                                                                   0    0   11   11
                             11.00 +IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII                                               0    0   31   31
                             12.00 +IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII            0    0   66   66
BOUNDARY BAY                 13.00 +IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII            0    0   66   66
                             14.00 +IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII                                               0    0   31   31
                             15.00 +IIIIIIIIIII                                                                   0    0   11   11
                             16.00 +IIII                                                                          0    0    4    4
                             17.00 +IIII                                                                          0    0    4    4
                             18.00 +                                                                              0    0    0    0
                             19.00 +I                                                                             0    0    1    1
MUD BAY-BOUNDARY BAY         20.00 +I                                                                             0    0    1    1
                             21.00 +                                                                              0    0    0    0
                             22.00 +                                                                              0    0    0    0
                             23.00 +I                                                                             0    0    1    1
CRESCENT BEACH               24.00 +I                                                                             0    0    1    1
                             25.00 +                                                                              0    0    0    0
                             26.00 +                                                                              0    0    0    0
                             27.00 +                                                                              0    0    0    0
                             28.00 +                                                                              0    0    0    0
                             29.00 +I                                                                             0    0    1    1
                             30.00 +II                                                                            0    0    2    2
                                   0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   vara varb varc  all
                                   +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
```

Table 290-2 (cont'd)

```
                         position(km)
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
  SEMIAHMOO BAY         31.00 +||                                                                           0    0    2    2
                        32.00 +|                                                                            0    0    1    1
                        33.00 +                                                                             0    0    0    0
                              +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                              0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75  vara varb varc  all
```

Table 290-3. Herring statistical spawn summary for section 290.

Year	Total records	Spawn index	Sum length	Av wid	Av int	Av date	SE date	Wt date	Min day	Max day	Ind day	Ind loc
1937	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1938	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1939	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1940	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1941	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1942	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1943	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1944	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1945	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1946	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1947	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1948	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1949	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1950	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1951	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1952	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1953	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1954	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1955	5	213311	5621	219	2.2	57.4	7.15	59.1	50	86	3	2
1956	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1957	1	114454	3016	274	1.0	76.0	0.00	76.0	76	76	1	1
1958	1	104056	2742	274	2.0	74.0	0.00	74.0	74	74	1	1
1959	1	104056	2742	229	1.0	45.0	0.00	45.0	45	45	1	1
1960	1	173427	4570	1371	1.0	52.0	0.00	52.0	52	52	1	1
1961	2	260140	6855	1029	1.0	63.5	9.50	66.7	54	73	2	1
1962	4	336456	8866	47	1.8	49.0	0.00	49.0	49	49	1	1
1963	8	768619	20254	142	3.0	53.0	1.89	53.0	48	58	2	1
1964	8	568780	14988	217	1.0	59.0	4.16	59.0	48	70	2	1
1965	4	197714	5210	77	1.5	54.0	0.00	54.0	54	54	1	1
1966	1	208112	5484	914	3.0	60.0	0.00	60.0	60	60	1	1
1967	8	1221616	32191	788	1.0	66.3	5.59	67.3	46	90	4	1
1968	4	294826	7769	240	2.0	58.5	4.17	59.4	50	70	3	2
1969	2	450910	11882	183	3.0	61.0	0.00	61.0	61	61	1	2
1970	3	93620	2467	91	1.7	66.0	4.00	64.2	62	74	2	2
1971	4	215057	5667	731	1.0	51.0	0.00	51.0	51	51	1	1
1972	1	312169	8226	91	1.0	49.0	0.00	49.0	49	49	1	1
1973	2	105802	2788	91	1.0	64.0	13.00	59.5	51	77	2	1
1974	4	312169	8226	103	1.0	58.8	7.75	54.4	51	82	2	1
1975	3	104056	2742	213	2.3	80.0	23.64	78.5	52	127	3	1
1976	4	456451	12028	91	1.5	71.8	8.52	72.2	49	89	4	2
1977	2	208112	5484	91	1.0	65.5	12.50	69.7	53	78	2	1
1978	1	52028	1371	46	1.0	51.0	0.00	51.0	51	51	1	1
1979	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1980	1	34685	914	46	1.0	60.0	0.00	60.0	60	60	1	1
1981	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1982	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1983	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1984	1	34685	914	68	0.0	59.0	0.00	59.0	59	59	1	1
1985	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
1986	0	0	0	0	0.0	0.0	0.00	0.0	0	0	0	0
All	76	6945313	183017	295	1.6	60.0	1.60	60.4	45	127	27	6

Table 290-4. Spawn summary for section 290 from 1937 to 1986.

A. GENERAL:

There is one main spawning area in this section centered in the Boundary Bay vicinity.

B. COMPLETENESS OF RECORDS:

The 50 year record should be reasonably complete considering proximity to Whiterock and Tsawwasen.

C. SPAWNING CONSISTENCY OVER TIME: FREQUENT

There has been only one main spawning episode from 1955 to 1980.

D. MAGNITUDE OF SPAWNINGS: LARGE

1. NUMBER OF SPAWN YEARS/50 YEARS = 25/50 (1937-86)
2. NUMBER OF SPAWN YEARS/DOCUMENTED YEARS = 25/50 (1937-86)
3. CUMULATIVE SPAWN LENGTH = 183.0 Km.
4. CUMULATIVE SPAWN AREA = 694.5 ha.

E. SPAWNING TIME:

1. MEAN UNWEIGHTED DATE (DOY) = March 1 (60.0)
2. MEAN WEIGHTED DATE (DOY) = March 1 (60.4)

F. COMMENTS:

There are 76 records from Boundary Bay from 1955 to 1986 with a mean spawning time of March 1. This relatively early time is similar to the early times of the Gulf Islands, particularly Ganges Harbour. Also, the spawn records from Boundary Bay are not consistent over time indicating that this location does not support a resident stock. Instead it appears possible that during some years spawning may occur either in the Gulf Islands or Boundary Bay area. For instance, in 1984 no spawning occurred anywhere in sections 181 to 184 but there was an early spawn (Feb. 28) in Boundary Bay, the first recorded there since 1980. Therefore it is possible that spawnings in the Boundary Bay area are, in part, from early-spawning stock which spawns mainly in Ganges Harbour.

G. ROE FISHERIES:

No major roe fisheries are documented.